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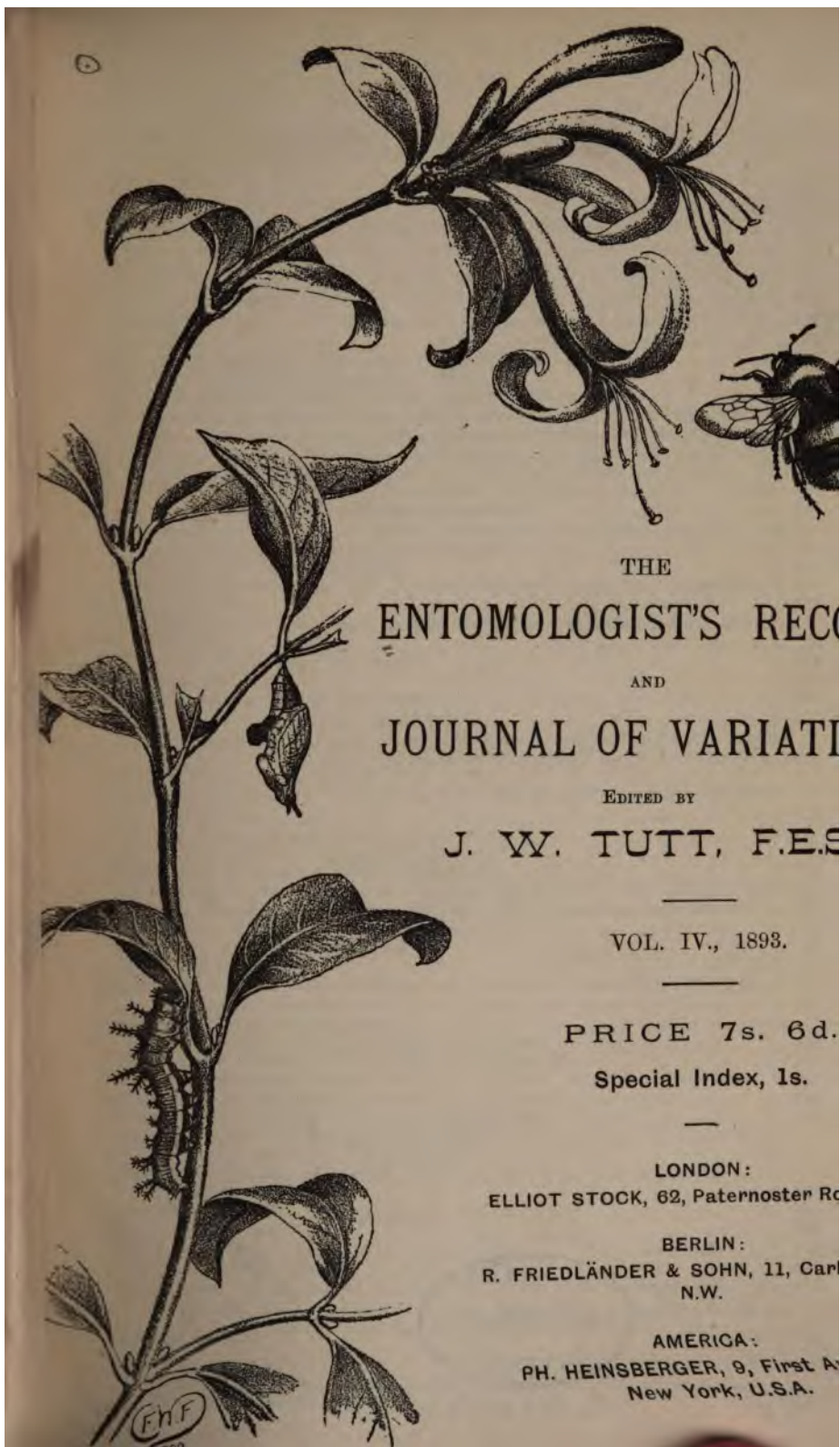
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The Entomologist's Record AND JOURNAL OF VARIATION.

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JANUARY 15TH, 1893.

LIFE HISTORY OF *DASYCAMPA RUBIGINEA*,

BY DR. W. S. RIDING.

On April 4th, whilst beating some salallows, I took a female *D. rubiginea* in good condition. On my return home, I placed her in a large card-board box, with muslin on the top, and kept her constantly supplied with thin syrup. On the morning of April 18th, I found a dozen eggs had been laid on the muslin during the night—singly, and scattered about. Between that date and May 8th, she laid altogether 123 eggs—from 4 to 16 a night—sometimes passing 24 or 36 hours without depositing any. The eggs when first laid, were pale primrose, and became mottled reddish-brown in about three days, remaining so till they assumed the usual leaden hue, shortly before the emergence of the larva. Each egg forms about $\frac{3}{4}$ of a sphere, and is flattened on the sides of attachment and ribbed. The ribs vary in number from 28 to 36, the alternate ribs stopping short of the apex. The diameter of the egg is .850 mm. The first larva emerged on April 27th, the last on May 19th. Out of the 123 eggs, 79 hatched; the rest were either infertile, or the larvæ died in the shell. They emerge at the side of the apex, and do not eat the shell for their first meal; they seemed to hatch in about 10 days. At this time, they have only twelve legs—the two anterior pairs of abdominal legs are just indicated by slight prominences, so that the larvæ look like those of *GEOMETERS*. They are leaden in colour, and covered with very long hairs—a third the length of the larva itself—pale yellow, and arranged in tufts. The trapezoidal tubercles are black, with hairs springing from each, and well-developed on the 2nd day; there are also similar lateral tubercles. The head is brown and shiny. On the 2nd segment there is a transverse, oblong black plate. The young larvæ began to feed at once on apple leaves, refusing dandelion. They nibbled the former in irregular holes, eating from the underside of the leaf through the parenchyma. The first moult of one I especially watched, took place in 11 days (May 8th). The two anterior pairs of abdominal legs were now distinctly developed, the front pair being smaller than the next. The colour changed to dark grey with a brownish tinge, and the larva appeared somewhat translucent. When not fully extended in motion they appeared annulated from the approximation of the trapezoidals. If disturbed, they fell off and rolled themselves in a loose ring. They fed at night only. In nine days more, the larva (which I may call No. 1) moulted for the second time. It then appeared darker, looking

blackish in the distance; in some of the others there was a purplish hue. The trapezoidals were very black and distinct, and had two or three pale reddish hairs springing from each. There was also a black tubercle with a fascicle of hairs on each segment, between the subdorsal and spiracular lines, just in advance of the line of the anterior trapezoidals; and further back there were two other similar black tubercles, one large and one small. The dorsal, subdorsal and spiracular lines were paler than the ground colour. The under-surface was like the upper, but paler. A third moult took place (with No. 1) in another 10 days (May 27th), and with it there was a decided change in the appearance of the larva. It became brownish-black, with darker rings, and velvety. The tubercles were no longer so conspicuous, but the rings were very marked, and the larva was covered with fine pale-reddish glistening hairs, still spreading in fascicles from the tubercles, but each fascicle containing many more hairs. Between the second and third moults the larvæ began to eat dandelion leaves as well as apple. They were very shy of light, and when uncovered, would rapidly make off for the nearest shelter. They collected together in some shaded nooks of the cages, resting in a curved position, with the head brought down towards the centre of the body, and it was very unusual to meet with a larva by itself. Can this gregarious habit have some connection with the rarity of the moth? The insect seems to deposit a large number of eggs, and the larvæ give little difficulty in rearing—the mortality being with me, *nil* after the first moult—eight dying between the hatching and that moult. When their enemies once find them, they would soon exterminate a great part of a brood. No. 1 had a fourth moult some nine days after the third, towards the end of the first week in June, and the following is a description of the larva at that time. Body tapers gradually from the 5th segment towards the anterior extremity, being much narrower in front than behind; it is blackish-brown and velvety, with a linear black mark 1 mm. (a little less than half a line) on each side of the dorsal line from the 4th to the 12th segments inclusive. The dorsal and spiracular lines are paler than the ground colour; the subdorsal scarcely noticeable; spiracles edged with blackish; a black transverse dorsal plate on the 2nd segment; the whole larva is covered with ferruginous glistening hairs in spreading fascicles 3.75 to 4.5 mm. long (about $1\frac{1}{4}$ to 2 lines). Thoracic legs black; abdominal legs colour of under-surface, which is paler than the upper. Head, small and black. After the first week in June, the larva (No. 1) seemed to remain quiescent for many days, and then began to feed more eagerly than before (previously all were small eaters), and on June 22nd, it began to form a cocoon. The previous description answers for the full-fed larva, with the exception that the latter seemed no longer perfectly homogeneous in the ground colour, but was sprinkled over with paler spots. The length at rest was 1 inch 1 line. Whether or not it again moulted before forming the cocoon I cannot be sure, I did not notice it doing so.

The cocoon is a slight one, made up of fine and coarse particles of earth, and lined very smoothly with silk inside. The larva (No. 1) remained in it without change till the end of July, when it formed a pupa. The other larvæ continued feeding during June, and began to form cocoons early in July, all having done so by the end of the *second week*.

The pupa is shining reddish-brown, two-thirds of an inch long; at the anal extremity there are two hooked spikes arising from a thickened base, and surrounded by a few short bristles, and two or three long silky hairs, by which it is attached to the silky lining of the cocoon, close by the remains of the last skin. The spikes are .50 mm. in length (a little less than half a line).

The pupæ were not disturbed, but were left in the cages in the open air, screened from the sun, except two, which were kept indoors. These latter produced imagines on October 15th and 17th (No. 1). The others kept emerging between October 21st and November 9th, numbering altogether 71, the times of emergence being, with very few exceptions, between midday and 4 p.m. There was nearly an equal proportion of males and females, with a slight predominance of the latter. Only two were crippled. The insects are large, most measuring 1 inch 5 lines across; a few a little more. The colour of the fore wings is yellow-ochre, varied with waves of red-ochre, and the usual black dots. They vary, however, from the type, in having a row of six white dots edged behind by black dots, between the subterminal line and reniform; two white dots edged in front by black, between the orbicular and the base of the wing; one on the fold, and one between that and the inner margin; there are two other white dots in front of and behind the reniform. All these white dots are placed on wing-rays, and are very distinct in a large majority of the specimens. In only a few do they vary in intensity, or have some absent. As is usual, the black lower half of the reniform is alone represented, and the orbicular may be said to be just indicated by two small black dots, anterior and posterior.—Buckerell Lodge, Honiton, Devon.

SCIENTIFIC NOTES.

HEREDITY.—I have just recently completed a small experiment in breeding *Polia chi* var. *olivacea*. In September, 1891, I took a ♀ *olivacea* with a ♂ sitting in close proximity to her. Thinking that they had recently been in copula, I kept the ♀ for ova, which she duly laid in the course of a few days. In the same month I took two ♀ *chi* (type), but there were no ♂'s near them at the time of capture. Both these ♀ laid ova. I kept the ova from all three in separate chip boxes, carefully labelled. They all hatched early in May, 1892, and I then sleeved them out on whitethorn, keeping them in distinct sleeves, and each sleeve was labelled. The young larvæ did very well till they were half-grown, when a considerable number died, some of the remainder dying when nearly full-fed. The rest pupated and most of them emerged. In every case, the insect produced from the ova laid by the ♀ *olivacea*, turned out *olivacea*, whilst those produced from the two typical *chi*, were about 75 per cent. typical *chi* and 25 per cent. *olivacea*. The experiment was not on a sufficiently large scale to prove that *olivacea* will always breed *olivacea*, but it tends in that direction. I should mention that all the larvæ had exactly the same treatment, being sleeved out till nearly or quite full-fed.—T. MADDISON, South Bailey, Durham. November, 1892.

I have been breeding some nice forms of *Hybernina defoliaria* from some selected dark-banded specimens taken last autumn. They have

followed the parents to a very great extent, as I have not bred a single uniform brown specimen, although these are usually met with freely.—
A. W. MERA. December, 1892.

THE NOCTUÆ IN THE BRITISH MUSEUM COLLECTION.—In the early part of 1892, in company with Mr. J. E. Robson, I looked over the NOCTUÆ in the British Museum Collection, and made a few notes on the various species. Some of these I have criticised at length in my recently published "Stray Notes on the Noctuæ," but I was unable to deal with all of them. Besides, some are merely notes for consideration and further reference, others relate to glaring blunders. If these notes aid in getting rid of some of the numerous errors in the collection, and calling attention to doubtful matters, they will have served their purpose. The notes I made at the time were as follows:—"*Calathysa alternanus* appears to be very much out of place, undoubtedly belongs with *Cleoceris viminalis*. *Microælia indicans* should be placed in the same genus as *Hecatera serena*. These are certainly altogether misplaced. *Agrotis heringi* is probably a pale ochreous and obsoletely marked specimen of *A. ripæ*. *Agrotis graslinii* is probably a pale ochreous *valligera*. *Agrotis catharina* is probably a *Teniocampa*, very like *Pachnobia rubricosa*, the antennæ are very similar to those of the latter species. *Agrotis olivalis*, Grote, wants comparing critically with *A. tritici*. *Agrotis nigricans* var. *carbonea*—Four typical specimens of this variety are mixed up with *Agrotis tritici*. The specimens marked as typical *A. obelisca*, are all essentially *hastifera*, Donz. *Agrotis insulsa*, Walker—The type appears to be a typical *A. nigricans*. *Agrotis transversa*, Walk., appears to be *A. corticea*. *Agrotis hyperborea*, a very fine series of the typical grey or glaucous form, is in the collection; then, in another genus, among *Pachnobia carnea*, are two specimens of *A. hyperborea* var. *carnica*, correctly labelled by Westwood. The error is most glaring. The person responsible for this seems to have considered that *carnea* and *carnica* must be the same species as the names are somewhat alike. *Noctua margaritacea*—Another glaring error, the last specimen in the series of this species being a typical *glareosa*. *N. perconflua*, Grote—This is certainly a variety of *N. festiva*. A second *perconflua* occurs in another drawer and appears identical with some of the Perth forms of *festiva*. *A. punicea*, Hb.—Another unaccountable error in this series, the two last specimens are *N. umbrosa*. *Semiophora declarans*, Walk. wants critically comparing with *A. ripæ*. *Mamestra (Hadena) thalassina*—The most interesting (?) series noted. As made up in this collection, it consists of eight specimens of *thalassina*, two of *H. adusta*, and four *H. genistæ*. *M. inisa*, Walker—This is a small *Miana strigilis*. *Mamestra infausta*, Walk. is probably *Agrotis cursoria*. *Mamestra reniformis*, Grote, appears to be identical with our *Hydræcia leucostigma*. *Leucania lithargyria*, three specimens in the series are *L. albipuncta*. *Leucania straminea*—Of a whole row thus named only seven are *straminea*."—J. W. TUTT. December, 1892.

VARIATION.

COLIAS EDUSA VAR. HELICK.—At Folkestone this year Mr. W. Austin and myself have taken, from August 10th to September 30th, besides a

large number of typical *Colias edusa*, 40 *C. edusa* var. *helice* and 34 *C. hyale*; contrary to the experiences of your other contributors, and counting the var. *helice* as a female *edusa*, we captured more females than males. — HERBERT MASSEY, Fairfield, Fog Lane, Didsbury. December 7th, 1892.

BOMBYX CALLUNÆ ABERRATION.—This season I bred a most interesting ab. of *Bombyx callunæ*, in which the right hind wing has two teeth, and the left hind wing one tooth, almost similar in shape to the dentations of *Lasiocampa quercifolia*. Is this a harking back, or a step forward?—F. B. NEWNHAM, Church Stretton, Salop. December 5th, 1892.

THE RELATIVE FADING OF TINT FROM EXPOSURE.—The difference in intensity of colour between the fore and hind wings of *Venilia maculata*, is, I also think, undoubtedly caused by exposure. I have often noticed it in this species. Another moth that shows this somewhat strikingly is *Iodis vernaria*. In this species, the fore wings, and the part of the hind wings exposed while at rest, are frequently found in captured specimens, to be of a dirty white colour, without a trace of green; while that portion of the hind wings that is concealed by the front ones, usually retains a very fair degree of the intensity of the original green tint.—R. M. PRIDEAUX, Ashted, Surrey.

CURRENT NOTES.

We are pleased to record the formation of the "Nottingham Entomological Society," and wish it every success. Mr. A. Pike has been elected President, and Mr. W. A. B. Ferris, St. Matthew's Vicarage, Nottingham, Hon. Sec.

A most interesting paper on *Heterocera* pupæ was read by Dr. Chapman at the last meeting of the Entomological Society of London. He stated that the ordinary *Macro*-pupa has the fifth and sixth abdominal segments moveable ("free"), and the larva of true *Macro* has the hooks of the ventral prolegs developed only along their inner margin. These two points taken together form a definition (inclusive and exclusive) of *Macro-heterocera*. Another form (*Micro*), and probably a much rarer form of pupæ, has the 7th abdominal segment moveable in the ♂, but not in the ♀. This form includes *Nepticula*, *Elachista*, *Tinea*, *Adelids*, *Tortrices*, and of groups hitherto called *Macro*,—*Zygæna*, *Limacodes*, *Cossus*, *Zeuzera*, *Hepiulus*, *Sesia*, *Psyche*; it also includes *Pterophorus* (but not *Alucita*). **PYRALES** and a few groups of **TINEINA**, have *Macro* pupæ. The *Micro* ("incomplete") pupæ, nearly always have some trace of maxillary palpi, and even highly developed, as in *Sesia*, *Limacodes*; in groups in which they are absent in the imago the *Macro*-pupa never has maxillary palpi of the same type. The "glazed eye" is a prothoracic, not a cephalic appendage. To turn our *Cossus ligniperda* into a *Micro* appears rather strange to us, but there is no doubt that it belongs to this less highly developed section of our moths.

The publishers of the *Ent. Mo. Mag.*, of which the late Mr. H. T. Stainton was so long an editor, propose bringing out a large photograph of that gentleman, and request intending purchasers to intimate their

intention (on a post card) to the publishers, Messrs. Gurney and Jackson, 1, Paternoster Row.

Mr. N. M. Richardson distinguishes between *Blabophanes ferruginella* and a pale form obtained at Portland, which he refers to *B. heringi*. He says that Portland specimens have by the side of *ferruginella* a washy appearance, due to the face of the forewings being sprinkled with pale ochreous scales; the fringes are pale ochreous; the hind wings are paler and their fringes much paler than those of *ferruginella*. At the same time he considers it difficult to pronounce *heringi* a good species, although it may be looked upon as constituting a well-marked local variety. There is, of course, a general tendency for Portland species to run pale (sometimes very pale) and this may be an extreme case, but the matter can certainly be left to Mr. Richardson to work out.

In the December number of *Entomological News* a photograph of several so-called new Noctuxæ are described by Professor Smith. One is our old friend *Hydræcia micacea*, who probably will feel doubtfully honoured by being considered unknown.

How strangely fiction fits into fact, and may probably replace it, is well illustrated in the September ('92) number of the *Canadian Entomologist*. A species of the Noctuxæ described by Walker and identified by Mr. Grote as an American species, *Eudryas stæ-johannis*, is labelled as captured at Horsley Downs; but since the genus *Eudryas* is strictly American, Grote suggests that the wrong label "Taken on the Church at Horsley Downs" got placed on this specimen, and apparently from other instances of "labelling" that have come under our notice in the Museum collection this is not unlikely. An editorial to this states that by *The Clergy List* there is a place called Horselydown in Southwark, and that this was probably the spot where the specimen was captured. Now in the first place no one would have written Horsley Downs for Horselydown, and in the second place Horsley is a well known entomological locality, whilst Horselydown has been covered with bricks and mortar of a very pronounced type for the last three quarters of a century. Mr. Grote's suggestion is much more probable than that of the Editor of our contemporary.

In the *Entomologist*, December, 1892, pp. 318-319, there is a record by Mr. A. Cowper Field of *Chærocampa celerio* being captured at Brighton. In a letter from the gentleman who records it, written to us, he informs us that he has British *Sphinx pinastri* in duplicate "taken in the New Forest and Suffolk;" British "*Deilephila euphorbiae* bred from larvæ found in Devonshire on the North Coast;" also *Aporia cratægi* "the British parents taken by an old friend residing in Boscombe, in 1886, or possibly a year or two earlier near Herne Bay. He has bred them for many seasons past, and kindly furnished me (Mr. Field) with many specimens." We have bred large numbers of foreign specimens, but could never get them to pair, but probably this hint will enable Mr. Frohawk or Mr. Hawes to fulfil one of the desires of their hearts in butterfly breeding, as Mr. Field will undoubtedly be able to get them ova or larvæ of British origin. Mr. Field very wisely observes that "in England, entomologists consider it so much easier to take *all* you want taken than breed from a *few* wild parents. This has exterminated *P. dispar*, *O. dispar*, *P. acis* and many others: it will do so with *S. pinastri* in Suffolk if Lord Rendlesham should publish the locality, as it has already done in

the New Forest, &c." Many lepidopterists will be glad to hear of Mr. Field's success with these species, but we should like to have our curiosity satisfied as to who captured the *celerio*, mentioned above? who the old friend is who has inter-bred British *cratægi* for so many years, and who it was captured Mr. Field's specimens of *S. pinastri* in the New Forest? As British specimens of these species have a high money value, we do not doubt that the necessity of publishing all possible facts relating thereto is evident, and it is clear that the *bona fides* of such specimens should be made clear to the entomological public. Writing without prejudice, we trust that Mr. Field will see the necessity of publishing the facts of the capture of these species.

Mr. Eland Shaw records the rare Orthopteron, *Mecostethus grossus*, captured at Irstead on September 10th, close to the bank of the river Bure.

The *Bulletin of the Botanical Department, Jamaica*, Nov. 36, October 1892, contains an article on "Coccidæ or Scale Insects" by Mr. T. D. A. Cockerell. It deals with the damage done by them, artificial means of getting rid of them, their natural enemies and other particulars. The *Bulletin* can be obtained for 2d. from Mr. Cockerell, Curator of the Museum, Institute of Jamaica, Kingston.

Liverpool has always been a noted place for new "Pugs." We remember Gregson's *knautiata*, *blancheata* and *curzoni*. It is, therefore, with a certain amount of expectation that we want to hear further of the "new species of *Eupithecia* from Sutherlandshire," exhibited by Mr. G. A. Harker at the annual meeting of the Lancashire and Cheshire Entom. Society on January 9th.

The election of the President of the Entomological Society of London takes place on Wednesday the 18th inst. at 7 p.m. The candidates are Professor Meldola and Captain Elwes. No election has taken place for any of the officers of this Society for many years, but it is felt that as the last President was a Systematist (the *Hesperidæ* being his study), the younger school of students interested specially in the more philosophical branches of entomology should have a turn, and for this reason Professor Meldola has been put forward as a candidate.

Mr. Ellison of Perth gives an interesting account of the occurrence of *Orambus myellus* in Scotland. He states that Mr. Herd first met with the species in Glen Tilt in 1883, and that it has been met with in more or less abundance every year since. Mr. Ellison points out that the species hides during the day in fir trees, and that the night and early morning are the best times in which to obtain the species. On one occasion (in 1887) arriving on the ground at 4 a.m., about a dozen specimens were captured in a very short time, being beaten from the trees. Open rides in woods, and isolated trees have been found most productive. As the species has occurred at Rannoch, and has been taken somewhat freely in Aberdeenshire during the last year, it appears that *C. myellus* remains comparatively rare, not so much on account of any actual scarcity of the species itself, as from the want of *Micro* collectors. When one comes to consider the large number of collectors of lepidoptera at work in Scotland, it seems amazing that those interested in the *Micro* lepidoptera may be almost counted on the fingers of one hand. For an entomologist to go into ecstasies over *Hydrilla palustris* and *Senta maritima*, and fail to be interested in the

Pyrausta; to capture a long series of *Phytometra cenea* because it is a Macro, and pass *unionalis* with the remark "only a Micro" savours of the ridiculous. Mr. Ellison further points out that although its ally *C. pinetellus* is generally common and distributed throughout Perthshire, yet it does not appear to invade the localities of *myellus*, the two species so far not having been found together.

NOTES ON COLLECTING, Etc.

HABITS OF THE LARVÆ OF LIMACODES ASELLA.—My experience of *Limacodes asella* may be to the point. When I began collecting these in 1884 I took twenty or so larvæ in October at Lyndhurst. Two years after (I could get none in '85) I searched for two hours and took one. I took it almost at the outset, so that my eye was not at fault. I bred that one and went down in 1886 and have been every year up to the present. I took five or six in 1888, I think Mr. H. A. Hill was with me, and took about the same number. Mine all died and so did his. Last year (1891) I took two and bred both. This year I went again, in rather a despairing mood and got several dozens, and Tate of Lyndhurst took two or three hundred I believe. I talked to him about them, and his experience exactly coincides with mine. Obviously then *asella* comes and goes. I hope the few members of the Exchange Club who have had larvæ from me got them to pupate as well as mine have done—on the leaf or twigs. I have never taken the pupæ in the wilds, nor has Tate. We have both searched carefully. Goodness knows where they go. The larvæ must be searched for; no one can beat them in numbers. The picture in the Ray Society book is perfect, and from larvæ of mine I believe.—G. M. A. HEWETT, Winchester. *November 8th, 1892.*

PARTIAL DOUBLE-BROODEDNESS OF SPILOSOMA FULIGINOSA.—I am much interested in a family of *S. fuliginosa*; the female was boxed near here on the 9th August, and she laid a large number of eggs. These hatched in a few days, and I fed the larvæ on plaitain; some fed up very soon, but most are still feeding. Of these a few are very small, but most are almost full-fed. Some of the earliest have come out as imagines, so that two sizes of larvæ, pupæ and imagines, have all been present in the same cage at the same time.—E. C. BAZETT. *October 15th, 1892.*

Like Mrs. Bazett I have been breeding *S. fuliginosa* this season. My lot I bred from eggs laid by a moth taken June the 7th. All three stages were in the box at the same time. A number of the larvæ are now hybernating; so it appears that the whole of the second brood does not emerge in the autumn.—T. TUNSTALL. *October 24th, 1892.* [These notes are interesting. Mr. Tunstall's larvæ are evidently of the same age as the parent of Mrs. Bazett's brood. The moth appears normally in May. Eggs are then laid and part of these emerge in August, the remainder hybernating. The interest of Mrs. Bazett's brood lies in the fact that she obtained yet another partial brood of imagines from an August moth.—Ed.]

DOUBLE-BROODEDNESS OF THE VANESSIDÆ.—The double-broodedness of the *Vanessidæ* is coming under discussion. I took full-fed larvæ of *atalanta* in the last week in July in a lane opposite to my house. They

emerged early in August, and the imago swarmed into October. During the first week in October I again took full-fed larvæ in the same lane, and I now have pupæ, healthy and well. They have been pupæ for a fortnight or three weeks and show no signs of emergence. I have seen it recorded that people saw larvæ of all sizes together in July, and we know how species spread themselves out, probably on their way to two definite broods, but it certainly looks as if my insects had nearly accomplished their aim. Also all the July larvæ were pale, and these autumn ones—from the same nettles—are some entirely black and all mainly so, with a few yellow spots along the sides.—G. M. A. HEWETT, Winchester. *November 8th, 1892.*

ABUNDANCE OF AMBLYPTILIA ACANTHODACTYLA.—Referring to this species (vol. iii., p. 267), *A. acanthodactyla* occurred freely both at Swanage and at Tenby. In the latter locality, I turned it out of rest-harrow by day, but at Swanage I saw but few in the daytime. *Edematophorus lithodactyla* also occurred freely at dusk in one spot at Swanage.—E. C. DOBRÉE Fox. *November 29th, 1892.*

AUTUMNAL EMERGENCE OF STAUROPOUS FAGI.—On the 6th of November last, a male *S. fagi* emerged in one of my breeding cages kept in a room far removed from any fire, and in which insects are generally behind their normal time of emerging.—F. B. NEWNHAM, Church Stretton, Salop. *December 5th, 1892.*

FLIGHT OF CALLIMORPHA HERA.—*C. hera* appears to fly at dusk; at least I caught one flying freely at that time. It is quite willing to fly in the daytime if disturbed, and seems akin to *Nemeophila plantaginis* in this respect, I did not get any at light, but possibly it comes late like *Arctia caia*, and I did not try after 11 p.m.—A. ROBINSON. *October 18th, 1892.*

I well remember seeing *C. hera* in great abundance on the slopes of Monte San Salvatore near Lugano, one very hot August morning, three years ago. It was flying freely in the brilliant sunshine over a sloping steep side of the hill, which was covered with brambles and low bushes. The elevation was about 1,000 feet. I have no doubt that on a very hot bright day in this country it would fly without being beaten out. I caught two or three of the specimens which were in splendid condition.—T. MADDISON. *November 21st, 1892.*

A FEW DETAILS ABOUT LITHOSIA RUBRICOLLIS.—I have never tried to keep the larva of this insect. It begins to appear in the beating tray in September, and is full-fed towards the end of October. It feeds on the very minute lichens, mainly on the oaks and beeches. The food looks just like a kind of scurf on the bark of the trunks and branches of the trees. When full-fed it retires beneath the moss on the trunks, where after nearly a month's interval the pupa may be searched for. I generally wait till the end of November, as it takes a long time to pupate. The pupa is a light reddish-brown colour, enclosed in a very flimsy white cocoon, hardly to be distinguished from the spinning of the spiders; it is sometimes conspicuous, but often the pupa catches the eye first, apparently without any cocoon. It is advisable to detach the moss from the top downwards, as the pupa is not among the moss, but between the moss and the bark, and consequently often drops. Not unfrequently, after the moss is withdrawn, the pupa is found adhering to the trunk. Sometimes it is close to the ground; sometimes high up the trunk. I keep mine through the

winter on damp sand, with a layer of moss over them. Damp is necessary to them. The perfect insect emerges early in the morning, in June and July.—G. M. A. HEWETT, St. Winifride, Winchester.

XANTHIA AURAGO, &c.—I think we had a very good season last year. Certainly *Xanthia aurago* was plentiful, but I was not able to work them as I did last year. In one evening, however, I got almost a hundred specimens, and most likely should have taken many more, but a thunderstorm drove them under leaves and made it rather more difficult to find them; two nights before I got a considerable number; that was also a dripping night, almost impossible to get them dry into the killing bottles. *Agrotis saucia* was also fairly abundant, and I was pleased to find that in July, I had netted as specimen of *Camptogramma fluviala*, which has not been before recorded in our Reading list. I also captured a specimen of *Calamia lutosa*; only one I think has been found here before. We had a close search for the larvæ this year but failed, although I hope for better luck next year. We got a very fair number of the larvæ of *Nonagria geminipuncta*, and they came out well. E. BAZETT, Reading. [*C. lutosa*, I believe, feeds very differently from *N. geminipuncta*, going down completely into the roots, whilst the latter feeds in the stem.—Ed.].

AUTUMNAL COLLECTING IN THE NEW FOREST.—Wishing to try a little autumnal collecting in the New Forest, and not being able to find any information in my entomological books as to workable ivy, treacling, &c., I came to the conclusion that, either it was an unproductive locality at that season, or that collectors did not record their visits, or rarely visited it at all during the fall of the leaf. Being anxious to see what the New Forest really was like as an autumnal collecting ground, I journeyed down to Lyndhurst on the 13th September, for a fortnight's stay. Mr. Moberly's note in the November number of the *Record* was, naturally, very interesting to me, as we appear to have been treacling in different parts of the Forest at the same time. His locality (which, by the way, it would be desirable to know) though "quite apart from the usual haunts of entomologists," does not seem to have produced a much greater variety of species than the one I treacled (which is very much frequented for this purpose), viz., the path leading from Beechen Lane to the garden of the "Crown and Stirrup," and then turning off to the left at a right angle to a ride leading into the Brockenhurst Road. I treacled here on nine evenings only, and my captures were, with a few exceptions, identical as regards species with Mr. Moberly's. I did not see *Triphaena subsequa*, *Calocampa vetusta*, *Thyatira batis*, *Gonoptera libatrix*, *Epunda nigra*, *Orthosia macilenta*, *Miselia oxyacanthæ* or *Catocala promissa*, but in their places I got *Mellinia ferruginea* (2), *Cidaria psittacata* (1), *Thera firmata* (2 worn), and some nice specimens of *T. variata* (second brood). With the exception of *Asphalia diluta* (during first week), *Orrhodia vaccinii*, *Xylina rhizolita* and *Scopelosoma satellitia*, I did not find any of the species especially common. I took one each of *Xanthia cerugo*, *Orthosia lota*, *Noctua neglecta* and *Anchoelitis lmosa*. I got six perfect specimens of *Xylina petrificata*, which were all I saw. Mr. Hewett of Winchester, who treacled in my locality once or twice, got two or three more I believe. The times of first appearance vary somewhat from Mr. Moberly's list, as follows:—*O. lota*, on September 22nd; *A. litura*, September 16th; *X. cerugo* and *N. neglecta*, September 20th; *A. aprilina*, September 21st; *O. vaccinii*,

September 16th; *A. lunosa* and *M. ferruginea*, September 22nd; *H. protea*, September 27th; *C. psittacata*, September 28th; *T. firmata*, on September 21st. It will be observed that these dates are nearly all later than those given for the respective species in Mr. Moberly's notes. I think that if I had stayed another week, insects would have been commoner, and I should have got most of the species which he got and I did not, if not on treacle, at least on the ivy, which, I regret to say, was only beginning to come out properly when I left, which was on the 29th. I saw one weather-beaten *Triphena pronuba*, and also *Plusia gamma* on two nights; is the latter at all of common occurrence at treacle?* I have never seen it before. I can corroborate Mr. Moberly's remarks as to the time of appearance at the treacle. The moths generally arrived about 6 p.m. (i.e., just before sunset) and remained on about an hour and a quarter, after which very few were to be seen. Other orders, represented by beetles, slugs, snails and spiders then had the feast to themselves. I once counted on one tree, eleven snails and three slugs. Hornets also came on just before the moths and remained about a quarter of an hour. It was interesting to observe that the moths violated all the rules laid down by our "Handbooks," "Guides," "Companions," &c., for the regulation of moths visiting the treacle patches. They came on bright moonlight nights and on nights when it was cold, misty or windy. In fact, the best night of all was the 27th September, when it was so windy that moths were very nearly blown off the treacle on the more exposed trees. This confirms Mr. Adye's note in *Ent.*, vol. xx., p. 86. On another day (the 28th) it had been raining a good deal during the afternoon; but in the evening the clouds cleared off. When I went as usual to treacle I found the trees dripping, the ground like a sponge, and a thick white mist over the meadows; besides these pleasant details the moon was shining and the air was decidedly chilly; yet in spite of all this there were lots of moths on the treacle. I have therefore come to the conclusion that the visits to treacle of autumnal insects are not in the least affected by weather. I may further mention that during the first week of my stay we had several frosts; probably, I should think, shortly after midnight, as I did not see any signs of them myself. Nothing in the early evening with the net was a dead failure, the only species seen being *Rumia luteolata*, two or three in fine condition. Butterflies were woefully scarce, the only ones seen at Lyndhurst being *Gonopteryx rhamni* (moderately common and slightly worn); *Vanessa io* (occasionally); *V. atalanta* (1), on an ivy bush on September 28th; *Colias edusa* (4), two of which I caught—both males, one perfect, the other much worn; *Satyrus egeria*, not uncommon and not as fresh as they might have been. *Epinephele tithonus* (1) ♀ worn; very few "Whites," no "Blues," no "Fritillaries," no "Skippers." I expected to see very miserable examples of all these groups, and was surprised to find that not even such were visible. The absence of butterflies in the enclosures was somewhat relieved by the usual frantic zigzagging of *Orygia antiqua*, which was fairly common and imparted a little life to the scene.

* It occasionally comes, but we have seen hundreds flying at the flowers growing at the foot of a post we had treacled without one being attracted by the artificial "sweets."—ED.

Larvæ were very plentiful. By beating and searching I obtained the following:—*Amphidasys betularia* and *Notodonta ziczac* (both common and of all sizes); *N. camelina* about a dozen); *N. dromedarius* (2) off alder; *N. dictæoides* (1) off birch; *D. coryli* (2); *Eucosmia undulata* (5); *Halias prasinana* (ad lib.); *Eupisteria heparata* (2); *Lithosia rubricollis* (common). *Odontopera bidentata* (a few); *Boarmia roboraria* (tolerably common). The majority of the above I took in Beechen Lane, and the enclosure commonly known, I believe, by the euphonic name of "Jones's," and situated behind the "Crown and Stirrup."

I spent both Sundays at Bournemouth with relatives. The pleasure gardens there were bright with flowers, but the only insects of a lepidopterous nature that I saw were about 2 each of *V. atalanta* and *V. urticæ*. On Monday the 19th September, I went to Swanage by boat from Bournemouth to try for *C. edusa*, which I was informed would probably be still common there on the way to Tilly Whim caves. The day was bright at intervals and warm; but I only saw about a dozen, of which I was unable to capture more than two, owing to the rough nature of the ground which was about half-way down the cliff. These two were both males in very fine condition, one of them having the pinkish bloom on the hind wings. I also saw a few *V. atalanta*, *V. cardui* and *Lycaena icarus*; all these were more or less worn, though I took one very fine and perfect male *icarus*. This, with the two *edusa* formed the whole of my catch, so that my visit to Swanage was not a brilliant success, entomologically speaking.

One of the first things I noticed when I got back to London was the antique and miserable appearance of what foliage there was here, and what a contrast it made with what I had left behind. The oaks and beeches in the New Forest were in fine form, hardly a yellow leaf to be seen, though the alders, birches, and chestnuts were beginning to turn colour a little, especially in exposed situations. The willow also was mostly good, but here and there a leafless bush was to be seen.

Such was my autumnal holiday in the New Forest, and I returned home very well satisfied.—C. NICHOLSON, 202, Evering Road, E.

PRACTICAL HINTS ON THE ARRANGEMENT OF OUR CABINETS.—As this season of the year affords the lepidopterist rather more than his usual scanty share of leisure, the following few hints may possibly be read just now with interest by those who wisely embrace the opportunity afforded them during the "dead" season, of re-arranging their past captures, of extending their series where practicable, and, what is always possible, studying symmetry and neatness, with the view that each season may see a nearer approach to that perfection, which, whilst unobtainable in full, is yet very closely approached by many of our well-known collectors, and which, in its degree, should be the ideal of every collector, worthy the name of such. Whilst not wishing to detract in any way from the laudable efforts of those numerous scientists who have in the past issued Synonymic Lists and methods of Classification, approved by their own study of arrangement, and all of which have many points of merit and many ardent supporters, yet it appears desirable that each student should embody in the arrangement of his own collection such alterations as may be the result of the very close study brought to bear in recent years upon individual groups or families, by scientific observers who well deserve the title of "specialists," from the wonderfully

keen intelligence and careful observance which they have devoted to the clearing up of some of the anomalies which do and must continue to occur in all merely compiled Lists or Catalogues. Where space and opportunity permit, the study of variation should not be neglected, and should be taken up, not only from the point of view of rarity or even "unique"-ness, with its commercial side of "value," but from the scientific point of view of cause and distribution in their respective relations. To do this thoroughly and, at the same time, not neglect the more evident and apparent results of uniformity and symmetry, are problems which, at the present moment, are beginning to occupy the attention of many, who from the older *penchant* for short series, had considered their collections practically complete; and this should spur the younger collectors to greater energy, for, as the old adage pithily puts it, "Well-begun is half-done," and it is in the power of all of us to begin well.

The first and most important point is, to decide upon the extent which the collector wishes his collections to occupy, wherever this is practicable; and with this end in view, the sight at first of the inevitably numerous long empty series must be borne with, and should act as an invaluable stimulus to additional energy in field-work, and may I add, in these days of exchange on a strictly commercial basis, should also afford scope for the generosity of those more advanced, who thereby have the opportunity afforded them of giving much pleasure at very little personal cost or trouble. Should the cabinet drawers be second-hand and dirty, they must be thoroughly stripped, and the cork examined, and where loosened, fastened down securely, and if necessary, well rubbed with glass paper to renew the surface before being repapered. The papering is much a matter of personal aptitude, and those to whom tedious mechanical and rather tiresome work is distasteful, would do best to send their drawers to one of the numerous dealers in apparatus, as all the subsequent time and trouble necessary, to careful arrangement, deserve at least a good start, by beginning with neatly papered drawers. Where they are not sufficiently badly stained or dirty to need repairing, they can be painted with oxide of zinc, which imparts a good white surface, filling up all old pin-holes, and if carefully applied, and when dry, well rubbed down, will afford a perfectly level white surface, free from all lines and smudges. A word here to those who may have cabinets in which no camphor cell has been provided; it is a very simple and easily accomplished job to add one, by procuring thin slips of wood (or even card-board will answer) the width and depth of the drawer, fixing same by glueing small blocks of wood in the inner corners of the cell thus made, and not forgetting to perforate the slips to allow of the evaporation of the contents into the drawer. The width of the cell need only be a fraction of an inch, and the wooden frame of the glass will in most cases, hide it from sight; but where sliding glasses in grooves are used, a narrow slip of paper can be pasted on the glass as a border, and can be made of sufficient width in front to hide the cell. This plan is far superior to any contrivances of pill-boxes or bags for camphor or naphthalin pinned in the corners of drawers, both on the score of safety and appearance. Before commencing to divide even the first drawer, it is essential to look ahead, and remembering the number of drawers available, to rigorously allot to each species the space that can be allowed, and this is best

begun from both the first and the last drawers, as an idea of the space at disposal for each species is then more quickly acquired. Where space will permit do not be afraid to allow plenty, even to species that may at the time rank amongst our greatest *desiderata*; for who, a few years ago, would have left a column for such species as *Plusia orichalcea*, *Ennomos autumnaria* etc.? therefore whenever possible err on the safe side of too much space rather than too little. At the present time, it looks as if we may soon require space in all our cabinets for *Plusia moneta*, whilst among the *Caradrinidæ*, more intelligent working will doubtless ere long cause our present members of the genus in many old cabinets, to be uncomfortably elbowed and jostled by new-comers. As an aid in allotting space, of course, access to a friend's well-arranged cabinet is the most valuable, but for the information of those not so favoured, the following notes may be of service. Supposing a column be allotted to each species, and drawers to measure about 17 in. wide, it will require nine drawers for the RHOPALOCERA, of which the *Pieridæ* and *Colias* (with *G. rhamni*) will occupy the first two, the Fritillaries mainly the next two, the Blues just securing No. 8, and the Skippers and Coppers the last. In my own arrangement I have occasionally varied, by only allotting half a column to species of small size, and not of a tendency to much variation, thus my "Footmen" and allied species, comfortably occupy a single drawer (No. 14), in half-columns; this is invaluable when exhibiting any particular family, as it avoids having to move two drawers with part of a family in each. In this way, the "Tigers" occupy their own drawer (No 15), in whole columns, and the beauty of this arrangement will at once be grasped by those who may have the pleasure of showing non-entomological "sisters, cousins and aunts," their treasured collections, the glaring splendours of this drawer, causing a veritable enthusiasm, which is welcome after the very cold reception of our greatest rarities in the dull "Caradrinas" and dowdy "Pugs." In this arrangement, the NOCTUÆ should commence in (about) drawer No. 24, and will occupy about 29 drawers, thus, if two 32-drawer cabinets are devoted to Macros, leaving twelve drawers for the Geometers, which will entail allotting only half-columns to all the smaller members of the group (but with small "Waves" and "Pugs" this is an advantage rather than otherwise) but at the same time, the Macros really deserve (with column series in most instances) at least 72 drawers, viz., a 40-drawer and a 32-drawer cabinet. In arranging on this scale, a very little forethought will soon discover advantages to be secured in allotting special drawers to single genera; thus in my case, the *Triphænidæ* occupy (and well fill) a drawer to themselves, and the *Eupitheciæ* just secure another; but to do this, extra spaces will often have to be left in neighbouring drawers, and here a word of advice will be invaluable to beginners. Find out which species are constant and which are variable and act accordingly; thus to such species as *X. polyodon*, *T. orbona*, *A. tritici*, *cursoria*, *ripæ* (and some others of this genus), *H. pisi*, *suasa*, *adusta*, *H. elutata*, not to mention such aberrant species as *C. caja*, and *A. grossulariata* (to which advanced collectors allot special drawers) leave, if possible, a little extra space, which may be safely taken from such as *D. pinastri*, *N. triangulum*, and many others. Another very necessary word of caution is as regards some standard for the maximum expanse of wing in each species, which should always be fully allowed for when measuring the widths of the

columns. The figures in the standard works are of necessity not to be depended on, as it rarely happens that the largest individual of any species was available to the draughtsman, and a small margin should always be allowed, and even this is often overstepped, particularly in the Geometers, where I have bred *A. prunaria* vividly in my memory. An invaluable aid would be afforded if the maximum expanse of wing were given as an addendum to the next "Exchange List" which may be brought out, or to go further, if a sketch or draft of the most suitable arrangements of Macros for the ordinary stock size, 30 and 40 drawer cabinets were to be given, but this is beyond the limits of the present few notes.

Next, as to dividing the columns and guiding the eye, many plans are in use, each recommending itself to its supporters, and of which the most reprehensible to me, is, ruling lines of any sort whatever on the paper; many rule merely a thin pencil line to guide the eye for inserting the pins, and which is completely hidden *when* the series is complete; this *when* however, spoils the effect. The objection to heavier rulings between the species is apparent at once, as it entirely prevents the re-arrangement of drawers which is continually necessary, and involves much soiling of the paper, even if the drawer be entirely cleared and the lines rubbed out. Preferable to this is the plan of black ruled lines on paper *cut* out and pinned down where required; it is impossible however, to obtain these sufficiently fine and true to give a good effect. My own are divided by silk threads, glued at the ends to very small circular tabs of paper, through which the pins to secure them are passed. These I make in numbers at a time to the required length, and I find them invaluable, neat and easily moved; but a caution here. do not use silk twist, as they go baggy according to the state of the atmosphere, and continually stretch loose; use plain silk threads, and secondly, be sure to keep your threads when made, pinned out on a board till required, or they hopelessly tangle. A quicker method than this but not nearly so easily shifted, is to use silk thread, but in one length for each drawer, passing it round each pin and only fastening off at the beginning and end of each drawer; the objection to this is of course that of altering any one column; you must interfere with each by loosening the whole length of silk. Lastly and most important, with regard to data, let the locality of each series be clearly indicated where everyone who looks through your collection can at once refer to the labels; if you adopt the method of attaching a label to each pin, go further, and place a larger label at the foot of each separate series, to avoid the necessity of moving an insect to acquire information, and if neatly printed, these need be no detriment to the appearance of the collection, and certainly greatly enhance its value, whilst affording many a brother collector the opportunity of both giving and acquiring valuable information, and acting as an incentive to "fight our battles o'er again." Many excellent suggestions have been made as to the adoption of an *universal* system of indicating locality by means of numbers, initials, etc., both independent, and also to correspond with maps of England, divided into numbered sections, but they all lack the quick recalling to the mind of some favored hunting-ground in Fen or Forest. My own labels are printed on a small hand-press, in my spare time, on wet days when in the Isle of Wight, and answer every purpose. One further hint only: *always* give the date and any very special note of interest, such as "second brood," "hybernated," etc.

While I feel that most of the information in these few notes will be quite superfluous to many, yet, from the large number of collectors who have not yet reached the *unhappy* state of repletion in all but the unobtainable species, I have no doubt but that they will be read with interest by many, to whom I trust they will prove of some slight service.—ALBERT J. HODGES.

SOCIETIES.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*Tuesday, 20th December, 1892.*—Exhibits:—Lepidoptera.—Exhibits of *Colias edusa* were made by Messrs. Bacot, Battley, Bayne, Clark, Hill, Lewcock, Nicholson, Prout, Riches, Rosevear and Smith, and included several var. *helice* and intermediate forms between that and the type, also a preserved larva. Coleoptera.—Mr. Lewcock, *Nebria complanata*, taken by Mr. Cuthbert, in Ireland; *Pachyta collaris*, and several other species from Farnham; *Cryptocephalus fulcratus* and others from West Wickham, and several species from Brockenhurst.

Mr. Battley then opened the discussion on, "The *Colias edusa* of 1892." After expressing his thanks to various gentlemen who had sent him notes, he gave a general sketch of the appearance of *edusa* in 1892. "The earliest record was from the New Forest by Mr. P. W. Ridley of Bath, on 24th May. On the following day (25th) *edusa* was seen at Blandford (Dorset), Gussage near Cranborne, and, about this date, at Bognor and Weymouth. On 28th, Dorking and Chichester produce records, and on the 29th, Cowley (Oxon), and one unaccountable specimen at Doncaster. May 30th shows a further extension to Mickleham, Bexley, Dartford and Cambridgeshire, and on May 31st, the extension in a westerly direction is continued by records from Cleveland and South Devon. After this, *edusa* is recorded almost every day up to 26th June, reaching St. Bees on the north, and Tenby westwards. He then discussed the theories as to the origin of these specimens. The first, that they were bred in England the previous autumn and had hibernated, was disproved by the fact that *edusa* was scarce in the autumn of 1891, and that the spring specimens were above the average in size. The second theory, that they were the result of eggs laid by the autumn brood, the larvæ having fed up during the winter was hardly possible, as the spring specimens were chiefly worn and faded; the few fresh specimens taken being similar to the few *Gonepteryx rhamni*, which could be obtained in good condition in the spring. He therefore, held to the 'migratory theory,' as explaining their occurrence; the reasons given being, their large size and tattered condition, and the dates of appearance. If they had been English, either hibernated or freshly emerged, they would appear in a scattered way over the country, but on the contrary, the first record (New Forest), was followed in regular order by others at further and further distances from it, showing the progress of the flight, and their gradual dispersion over the kingdom, the place of landing being on the Hampshire Coast. After a few notes on the life-history of the species, he passed on to consider the distribution of the August brood, which had been recorded from every English county except Northumberland, Durham, West-

moreland, Cumberland, Huntingdon and Rutland, its apparent non-appearance in the last two being probably the result of want of observers. In most of the southern counties it had been very common, the coast-line from the Isle of Wight to Suffolk, being its head-quarters. In Lancashire and Yorkshire it was local or scarce, its northern limits in England, ending in the two most northerly counties in which the spring specimens were seen. Seven specimens however, had been noted from Scotland, Perth being the northern limit. Passing to the west, it had been recorded from six counties in Wales, and as 'somewhat plentiful' in the Isle of Man, while Co. Dublin, Ireland, produced two or three specimens. Further south, it 'swarmed' in the Channel Isles, but notes were wanted of its occurrence on the Continent. With regard to the habits of the species, he remarked that it was not so attached to clover fields as *C. hyale*, but appeared to be equally plentiful on flowery fields, downs and undercliffs. Several collectors mentioned its fondness for ragwort flowers, on which its protective colouring renders it inconspicuous. He had also noticed it flying along the borders of potato fields in North Devon, and Mr. Lewcock recorded an instance of a single male specimen being taken on sugar in 1857. The variation of *edusa* might be divided into four heads:—(1). Colour.—The females varied from white (var. *helice*) through pale yellow, to orange, and the males from lemon to orange, the darker specimens frequently having a flush of purple on the hind wings. (2). Markings.—This was chiefly in the size of the discoidal spot, and the yellow spots or lines in the dark border. (3). Size.—Possibly the result of food. The lemon variety was nearly always small in size. (4). Shape.—Best shown in the hind margin of the fore wings, which was sometimes very convex, and sometimes straight or concave." Mr. Hawes then gave a detailed account of his experience with the species during the past season. The first *C. edusa* he had seen appeared on the 28th May, on the borders of Highgate Woods, and from that date to about 12th June, five more had been noticed on the G. N. Railway between Finchley and Finsbury Park. On 6th June, a male in good condition, was taken at St. Osyth, Essex. It was observable that in each case the insect was flying from a southerly quarter, in obedience to a general impulse and influenced by the prevailing winds. Allusion was made to the large numbers seen at Felixstowe, between August 20th and 23rd, and also to the capture there of six specimens of *C. hyale*. Mr. Hawes then proceeded to the question as to the stage in which *C. edusa* hibernates in Britain. He noticed the fact that the egg, which was similar in structure to the ova of *Gonepteryx rhamni*, *Euchlœ cardamines*, and the *Pieridæ*, was far too fragile to withstand even the mildest winter, and doubted whether the larva was sufficiently proof against frost and cold, to hibernate successfully, at least in this country. He then suggested that a fair inference might be made by comparing *C. edusa* with *G. rhamni* in the imago state. The two species were similar as regards antennæ, clothing of thorax and body, and general strong build of wing, and as the likeness might be extended to the previous stages of both species, he thought it not too much to say, that if *C. edusa* could be made to settle down in this country, the species would follow the example of *G. rhamni*, and pass into hibernation early in the autumn, re-appear in spring, pair and produce the imago during late July, August, and (perhaps in the north) September, thus being confined, as in the case of *G. rhamni*, to a single

brood. In reply to Dr. Buckell and others, Mr. Hawes stated that he understood from Mr. Tutt, that the great home of the species in Europe appeared to be among the mountains of Switzerland, at a low level, and that the area of the periodic immigrations, therefore included the adjacent lower-lying parts of France, Belgium and Holland, as well as Great Britain; in its native region, the species is understood to hibernate regularly, much in the same way as *G. rhamni* does in England. Replying to a further question, Mr. Hawes gave it as his opinion that *C. hyale* visited this country in the early summer months of this year (1892), similarly to *C. edusa*, though usually in fewer numbers, and spread over a more limited, *i.e.*, south-easterly area. Mr. Tutt stated that *edusa* appeared to be a native of the Swiss Alps, and there it generally seemed to produce a single brood, the imagines being driven into hibernation soon after their emergence by the cold weather. From this centre it occasionally migrated to various parts of the Continent, including Britain, and then tried to produce a second brood in the late autumn, failing to do this it became exterminated. He expressed his opinion that if the English winter were to set in shortly after the emergence of the August brood, they would hibernate at once, and the species would be common the following year. The proceedings concluded with a vote of thanks to Mr. Battley for opening the discussion.

Tuesday, 3rd January, 1893.—This Society held its annual Pocket-box Exhibition, and several interesting exhibits were made. Among others, Mr. Clark exhibited two varieties of *Argynnis selene*, one with the upper side dusted with black scales, the other having the black markings coalescing into a central band; a specimen of *A. euphrosyne* with a pale (xanthic) hind wing; and a small darkly suffused specimen of *Saturnia carpinii*. Mr. Bloomfield, a bred series of *Papilio machaon*, one specimen having a red inner margin to the black band on the hind wings; a series of *Colias edusa*, including a female without the yellow spots in the marginal band; also spring and summer specimens of *Selenia illumaria*. Mr. Battley, a variable series of the undersides of *Epinephele hyperanthus* from Caterham and North Devon. He pointed out that the lower spot on the upper wing was frequently absent, and that in no case were the two sides exactly similar in markings. Mr. Jackson, *Stauropus fagi*, *Macroglossa bombyliformis*, *Cymatophora ridens*, *Cuspidia alni* and *Ephyra omicronaria*, all taken in the New Forest last May; also a specimen of *Polyommatus phloas* from Walthamstow, without the band on the hind wings, but with red streaks on the wing rays. Mr. Tremayne, a number of species from the New Forest, including *Argynnis paphia* var. *valezina*, *Stauropus fagi*, and *Nola strigula*, the latter being taken on sugar. Captain Thompson, a small dark specimen of *Tephrosia bindularia* from Stafford, *Ptilodontis palpina* from Halifax, and *Hepialus sylvinus* from Hampstead Heath. Mr. Nicholson, *Cheimatobia boreata*, and some strongly marked specimens of *C. brumata*, from West Wickham; also *Leucania phragmitidis*, taken some years ago near Lea Bridge. Mr. Gates, *Antithesia salicana*, *Stigmonota internana*, *Homazosoma sinuella*, *Gelechia hermannella*, &c. all from Shepherd's Bush. Mr. Sykes, *Pecilocampa populi* and *Petasia cassinea*, taken on street lamps at Enfield. Coleoptera:—Mr. Heasler, *Myrmecoxenus vaporariorum*, *Hister bimaculatus* and *Bruchus pisi*, the latter being bred from peas. Mr. Rosevear, two large beetles from Travencore, together with

some of their eggs. Mr. Soul, a spider's nest from the Cape. This was larger than a cricket ball, composed of leaves and silk, and suspended from a twig by several threads. He also exhibited the spur of a cock, 13 years old.—A. U. BATTLE and J. A. SIMES, *Hon. Secs.*

ENTOMOLOGICAL SOCIETY OF LONDON.—December 7, 1892.—The President announced the death, on the 2nd December, of Mr. Henry T. Stainton, F.R.S., an ex-President of the Society. A vote of condolence with Mrs. Stainton was passed by the meeting. Mr. Frank Bouskell, of 11, Lansdowne Road, Stoneygate, Leicester; Mr. George C. Dennis, of Tower Street, York; Mr. Charles B. Headley, of Stoneygate Road, Leicester; Mr. William Mansbridge, of Luther Place, Horsforth, near Leeds; and the Rev. George W. Taylor, of St. Barnabas, Victoria, British Columbia, were elected Fellows of the Society. Mr. Jenner Weir exhibited a species of *Acræa* from Sierra Leone, which Mr. Roland Trimen, who had examined the specimen, considered to be a remarkable variety of *Telchinia encedon*, Linn. It was a very close mimic of *Limnas alcippus*, the usual Western African form of *Limnas chrysippus*. The upper wings of the specimen were rufous and the lower white, as in the model, and the resemblance in other respects was heightened by the almost total suppression of the black spots in the disc of the upper wings, characteristic of the usual markings of *T. encedon*. Mr. F. J. Hanbury exhibited a very remarkable variety of *Lycaena adonis*, caught in Kent this year, with only one large spot on the under side of each upper wing, and the spots on the lower wings entirely replaced by suffused white patches. He also exhibited two specimens of *Noctua xanthographa* of a remarkably pale brownish grey colour, approaching a dirty white, obtained in Essex in 1891; and a variety of *Acronycta rumicis*, also taken in Essex, with a beautiful dark hind margin to the fore wings. Mr. H. J. Elwes exhibited a living specimen of a species of *Conocephalus*, a genus of *Locustidae*, several species of which, Mr. C. O. Waterhouse and Mr. McLachlan stated, had been found alive in hothouses in this country. Dr. T. A. Chapman exhibited immature specimens of *Tæniocampa gracilis*, *T. gothica*, *T. populeti*, *T. munda*, *T. instabilis* and *T. leucographa*, which had been taken out of their cocoons in the autumn, with the object of showing the then state of development of the imagoes. Mr. F. W. Frohawk exhibited a living specimen of the larva of *Carterocephalus palæmon* (*Hesperia paniscus*), hibernating on a species of grass which he believed to be *Bromus asper*. The Rev. Canon Fowler and Mr. H. Goss expressed their interest at seeing the larva of this local species, the imagoes of which they had respectively collected in certain woods in Lincolnshire and Northamptonshire. Mr. Goss stated that the food-plants of the species were supposed to be *Plantago major* and *Cynosurus cristatus*, but that the larva might possibly feed on *Bromus asper*. Mr. C. G. Barrett exhibited a long series of remarkable melanic and other varieties of *Boarmia repandata*, bred by Mr. A. E. Hall, from larvæ collected near Sheffield. Mr. W. Farren exhibited, and commented on, four varieties of *Papiliomachaon* from Wicken Fen; also a series of two or three species of *Nepticula* pinned on pith with the "Minuten Nadeln," for the purpose of showing these pins. Canon Fowler exhibited specimens of *Xyleborus perforans*, Woll., which had been devastating the sugar-canes in the West Indies. Mr. C. O. Waterhouse stated that the larvæ had done great damage to beer-casks in India. Mr. E. B. Poulton showed, by means of the oxy-hydrogen lantern, a number

of slides of various larvæ and pupæ, in illustration of his paper, read at the October meeting, entitled, "Further experiments upon the colour-relation between certain lepidopterous larvæ and their surroundings." He stated that he believed that nineteen out of twenty larvæ of *Geometridæ* possessed the power of colour adjustment. Mr. F. Merrifield, the Rev. J. Seymour St. John and Mr. Jacoby took part in the discussion which ensued. Mr. F. Merrifield read a paper entitled "The effects of temperature on the colouring of *Pieris napi*, *Vanessa atalanta*, *Chrysophanus phlæas*, and *Ephyra punctaria*," and exhibited many specimens thus affected. In the cases of *P. napi*, *C. phlæas*, and *E. punctaria*, he remarked that they corresponded with natural variations of these species in regions or seasons associated with similar temperatures; and some curious effects produced by severe temperatures on *V. atalanta* seemed likely to throw light on the evolution of the complex markings of the Vanessas. Mr. Poulton, Dr. F. A. Dixey, Mr. Elwes, Mr. Jenner Weir, Mr. Tutt and Mr. Frohawk took part in the discussion which ensued. Mr. Kenneth J. Morton communicated a paper entitled, "Notes on *Hydroptilidæ* belonging to the European Fauna, with descriptions of new species." Mr. McLachlan made some remarks on the subject of this paper. Dr. T. Algernon Chapman read a paper entitled, "On some neglected points in the structure of the pupa of Heterocerous Lepidoptera, and their probable value in classification; with some associated observations on larval prolegs." Messrs. Poulton, Tutt, Hampson and Gahan took part in the discussion which ensued. Mr. J. Cosmo-Melville communicated a paper entitled, "Description of a new species of Butterfly of the genus *Calinaga*, from Siam." Mr. W. L. Distant communicated a paper entitled, "Descriptions of new genera and species of Neotropical *Rhynchota*."—H. GOSS and W. W. FOWLER, *Hon. Secs.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—December 12th.—Mr. J. Lea, Canning Street, was elected a member of the Society. The president referred to the death of the veteran entomologist, H. T. Stainton, and remarked that no one had done more to encourage the study of entomology. Messrs. G. A. Harker and H. B. Jones gave a paper entitled "Notes on a fortnight's collecting in Galway," the principal insects taken being *Zygæna minos*, *Miana captiuncula*, two specimens of *Triphæna subsequa* and *Rhodaria sanguinalis*, and exhibited specimens of, and pointed out differences between, English and Irish forms; the *Miana captiuncula* were especially interesting, being much more strongly marked than the English forms, the female having two entire cream coloured fasciæ, the *Lycæna icarus* females, from the same district, were very bright with large and brilliant red spots. Mr. S. J. Capper exhibited large Irish *Vanessa urticae*. Mr. Gregson, a remarkably fine specimen of *Prodenia testaceoides* (Gn.), bred from a larva taken in a market at Barnsley, by Mr. George Rose. Mr. Stott (on behalf of Mr. H. S. Clarke) *Sphinx convolvuli* from the Isle of Man, and some fine varieties of *Smerinthus tilie*. Mr. Pearce, a specimen of *Ceratocampa regalis*. Mr. J. Herbert Stott, *Sirex gigas* from a North Staffordshire coal mine.—F. N. PIERCE, *Hon. Sec.* [*Prodenia testaceoides* is simply a synonym of *P. littoralis*, Bdv.—"This species was first bred in Britain by Mr. Boden from an imported tomato. Of this we read:—Mr. Boden, at the City of London Ent. Society's Meeting of August 6th, exhibited a specimen of a NOCTUA bred from a larva found feeding on a tomato. He stated that the larva was brown and had a curious pig-

like head. The insect was unknown to the members present, the general opinion being that it had been imported with the fruit' (*Ent. Record, &c.*, vol. ii., p. 167). Further we read:—'This specimen has since been identified as the *Prodenia littoralis* of Boisduval, a species hitherto unknown in Britain. He (Mr. Boden) stated that he had failed to obtain any information as to the locality whence the tomato came, but expressed an opinion that, seeing how extensively this plant was now cultivated in England, it was quite possible that the insect might become naturalised in this country' (*l.c.* p. 260). Staudinger records it from 'Crete, Syria and the Canary Isles' (*Catalog*, p. 104). Colonel Swinhoe records it 'from Moulmein and Rangoon' (*Trans. Ent. Soc. of London*, 1890, p. 127). Butler writes:—'*Prodenia testaceoides* (Guenée, *Noctuelles*, vol. v., p. 165) is a slight variety, and *P. declinata*, Walker (*l.c.* vol. xi., p. 723), is a starved specimen' (*Transactions of the Entom. Society of London*, 1890, p. 666). I have not been able to test this statement, but as Colonel Swinhoe in the *Trans. Ent. Soc. of London*, 1890, p. 227, adopts Butler's synonymy, probably it is correct. Boisduval's original diagnosis of this species is as follows:—'*Alis anticis fusco violascentibus, maculis ordinariis nervo medio albedo junctis, strigis transversis pallidis, maculisque apicalibus sagittatis nigris; posticis albo-opalinis*' [*Fauna Madagas.*, etc., p. 91 (1834)]" (*British Noctuae and their Varieties*, vol. iv., pp. 124-125).—Ed.].

SOUTH LONDON ENTOMOLOGICAL SOCIETY.—December 22nd, 1892.—Mr. W. H. B. Fletcher exhibited a long series of *Liparis monacha*, and stated that in 1887 he obtained from Mr. Tate a batch of eggs laid by an ordinary (not in the least blackish) ♀, from the New Forest, and that by selecting every year the darkest of her descendants from which to breed, he had at last obtained a very dark race, and that there was no doubt in another year or so perfectly black specimens would be produced. A selection of specimens bred each year was exhibited. Those bred in 1888 were on the whole quite as pale as ordinary captured New Forest specimens. Those bred in 1889 from the darkest 1888 specimens were distinctly dark banded, those in 1890 from the darkest 1889 specimens had the central area very dark, and the outer margin suffused, whilst the 1891 and 1892 broods were still darker; some of the latter being nearly black. Mr. Fletcher stated that Messrs. Fenn, Bower and Porritt were the only lepidopterists who had had living specimens in any stage of this strain. He considered it necessary to bring forward the history of this brood, on account of the discussion at present taking place relative to this species. Mr. Adkin considered that the foreign specimens of var. *eremita* were browner than British, but Mr. Tutt said that certainly the well-bred specimens figured in the *Ent. Record, &c.*, in October last, and now known to be of German origin, were quite indistinguishable from the equally well-bred specimens exhibited by Mr. Fenn, and coming directly from Mr. Fletcher's British stock. Mr. Fletcher thought that the colour was quite independent of their origin, and that by selection, white or buff breeds might be established as readily as black. Mr. Dobson stated that he captured several specimens of a dark-banded race in the New Forest some years ago. Mr. Tutt remembered the occasion, as Mr. Dobson sent him some of the specimens, and they were now in his collection. Mr. Barrett remarked that "in-and-in" breeding was impossible in some species (*e.g.*, in the allied *Ocneria dispar*) without the species running out, and becoming

infertile. Mr. Fenn thought that "in-and-in" breeding could be carried on with much more success than was generally supposed, and under careful treatment many species tended to become larger, *e.g.*, *Camptogramma fluviala* and *Ennomos angularia*. Mr. Fletcher then made some remarks on pairing *Boarmia repandata*. Three races from the New Forest, Forres (small) and Sheffield (black) respectively, he attempted to cross. The black paired *inter se* and with the New Forest specimens, and *vice versa*, but neither the black nor the New Forest specimens paired with the Forres specimens. Mr. Adkin exhibited some Scotch specimens of *Tæniocampa gothica*. A little wild usage of the varietal name *gothicina* led Mr. Tutt to say that this form is not really a form with an obsolete gothic-mark as British lepidopterists are apt to consider it. Herrich-Schäffer, accustomed to the dark Linnæan type, in describing *gothicina* laid stress, first on the *rusty* ground colour, and secondly, on the *red* gothic-mark. Mr. Williams exhibited two *Colias hyale* bred *ab ovo* in Britain. The ♀ parent was captured at Northfleet, on the 19th September, 1892; the ova were laid on the 20th September, the larvæ hatched on the 29th; the first moult occurred on October 9th, the second on October 20th, the third on November 2nd. They pupated on November 10th, and emergence took place on November 25th. Mr. Barrett remarked that Hübner's names and figures relating to *hyale* were rather mixed. Mr. Tutt remarked that Mr. Williams was certainly to be congratulated on having bred the species *ab ovo*, the first time he believed it had been done in Britain.—Ed.

BIRMINGHAM ENTOMOLOGICAL SOCIETY.—December 12th, 1892.—The following exhibits were made: By Mr. Gwilym, *Acronycta alni*, bred from a larva found at Knowle, also *Lithosia complana*, taken at Bewdley. By Mr. C. J. Wainwright, *Isopogon brevirostris* and *Neotamus cyanurus* from Barmouth, and *Machinus atricapillus* from Brendon, Devonshire. By Mr. R. C. Bradley, *Chrysoclysta bimaculella* and *lineella*, and *Stigmonota nitidana* and *regiana*, all from Sutton. A paper upon "Secondary Sexual Characters in Insects," was communicated by Mr. J. W. Tutt, and read by the Secretary, Mr. C. J. Wainwright. —COLBRAN J. WAINWRIGHT, *Hon. Sec.*

THE CAMBRIDGE ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—Friday, November 11th.—The following addition to Rule V. was made, "That corresponding non-resident members be admitted into the Society, paying an annual subscription of 2s. 6d." Mr. Moss exhibited a specimen of *Vanessa atalanta* having a pale buff border* on the underside of the posterior wing, of the same width as the usual red one on the upperside. Mr. Wells, a variable series of *Cerastis vaccini* from West Wickham. Mr. Rickard, a specimen of *Plusia moneta*, taken at Cambridge in 1890; specimens of *Achæra chameleon* taken by himself in South Africa, a series of *Ephestia kühniella* bred from a mill at Cambridge, and some insects which he had found eating moths put into a box to relax; these were pronounced by Dr. Sharp to be larvæ of one of the *Muscidor*. Mr. Jones, three varieties of *Nemeophila plantaginis*, one nearly black; they were all more or less crippled, and

* This was most marked in some of the specimens exhibited by Mr. Merrifield at the Ent. Soc. of London's meeting in December last. *Vide, ante* Vol. III. p. 312.—ED.

he gave as his opinion that the abnormal coloration and crippling arose from a common disease. Mr. Farren, long and variable series of *Peronea variegana*, *hastiana*, *schalleriana*, *comparana* and other TORTRICES.

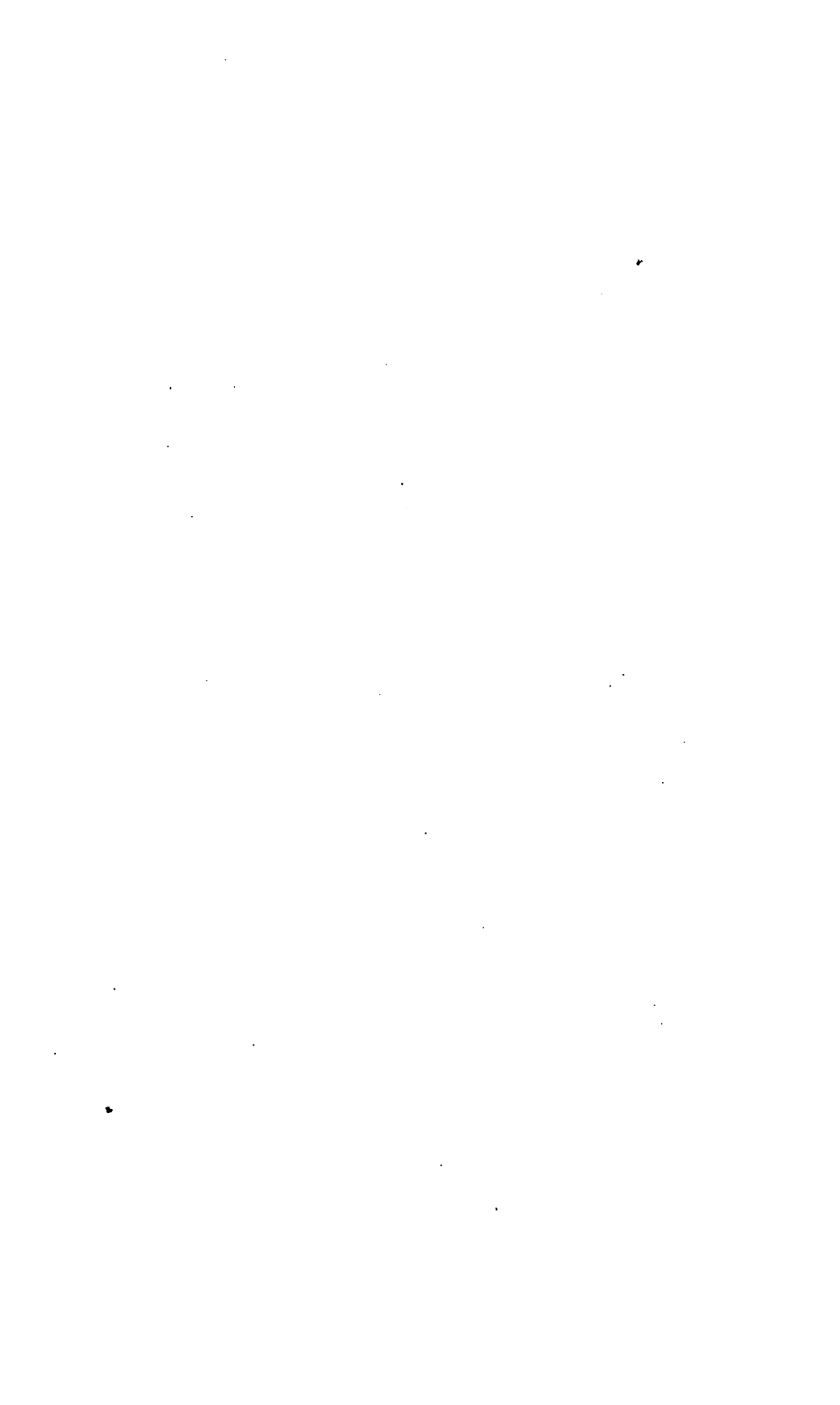
Friday, November 25th.—Mr. Farren, some strongly marked specimens of *Arctia lubricipeda* bred from ova, both parents being var. *radiata*. Mr. Fitzroy, a series of *Xanthia gilvago* and other NOCTUE, chiefly taken at Cambridge gas lamps during September. Mr. Rickard, some beautiful varieties of *Arctia lubricipeda* taken in a garden, a good pale variety of *Abraxas grossulariata*, and a specimen of *Epunda lutulenta*, all from the district. Mr. G. H. Bryan, M.A., read a paper, "Insect hunting in the Riviera," being an account of five weeks' collecting from the 22nd of March last at Alassid, Mentone, Hyères, Arles, Nîmes, Avignon, Tarascon, etc., giving long lists of Lepidoptera, Coleoptera, etc., captured or observed, and many interesting notes on their habits; the paper was illustrated by an exhibition of several boxes of the specimens collected, the Lepidoptera and Coleoptera being especially well set and in excellent condition.—WM. FARREN, *Hon. Sec.*

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—**December 14th, 1892.**—Mr. J. Hawkins exhibited a specimen of *Colias edusa*, taken within a mile of the Cathedral, York. Mr. R. Dutton, *A. lutulenta* from Castle Moreton; *Noctua sobrina*, Aberdeen; specimens of *Dasy-campa rubiginea*, Honiton; *Lithosia sericea*, Manchester; *Angerona prunaria*, Folkestone; *Noctua neglecta*, Aberdeen; *Lycena bellargus*, Redhill; *Psodos coracina*, Rannoch; *Apleta prasina*, Winchester; *Polia chi* var. *olivacea*, Durham; and a specimen of *Callimorpha hera*, taken in South Devon, in 1892. Mr. W. Hewett, *C. edusa*, and four specimens of the variety *helice*, taken at Erith, Kent, 1877; *Selenia lunaria* (bred) from Forres and Essex; *Himera pennaria*, York and Kent; *Selenia illustraria*, summer brood from Worthing; dark forms of *Odontoptera bidentata*, from Forres; *Tephrosia extersaria*, New Forest; *Eupithecia helveticata*, from Perthshire; *Cidaria suffumata*, and *Melanippe tristata*, Barnsley; *Hyppis elutata*, Pennistone Moor; *H. impluviata*, New Forest; *F. brunneata*, *Larentia ruficinctata*, *Viminia myricæ*, *Cymatophora duplaris*, *Aplecta tineta*, *Anarta cordigera*, and *Phibalapteryx lapidata*, from Rannoch; *Cucullia asteris*, Weymouth; *C. absynthii*, Kent; *Dianthæcia capsophila*, Kirk Michael, Isle of Man; *Cleoceris riminalis*, Wharholiffe Crags; *Agrotis corticea*, Forres; *Cuspidia strigosa*, Cambridgeshire; and *Xanthia silago*, from Acomb Churchyard, York. Mr. W. Mansbridge, F.E.S., of Horsforth, Leeds, then gave a highly interesting and instructive lecture on the early development of lepidoptera, and illustrated the lecture by numerous diagrams, most of which had been prepared from dissections, made by himself; Mr. Mansbridge dealt with the structure of the egg, and traced the various stages in the development of lepidopterous larvæ, and exhibited several very striking varieties of *Abraxas grossulariata*, bred from larvæ collected in the neighbourhood of Horsforth; also some fine examples of *P. chi*, and its variety *olivacea*, selected from a great number of specimens taken by him during the last two seasons in the neighbourhood of Horsforth, Yorkshire.—WILLIAM HEWETT, *Hon. Sec.*

OBITUARY.

PROFESSOR JOHN O. WESTWOOD.—It is with deep regret that we announce the death of Professor Westwood, which took place on the 2nd January, having completed the 87th year of his age on 22nd December last. For nearly 65 years Professor Westwood has been a most prolific writer on entomology; even so long ago as 1863 when Dr. Hagen published his *Bibliotheca Entomologica*, 379 contributions to the literature of Entomology are enumerated as having been written by him, and since that time many hundreds more have been added to that list. For many years of his life he was a contemporary author with those fathers of English entomology, Kirby, Spence, Curtis and Stephens; his earliest paper of which there is a record being a note on "*Psilus bascii* et *Dryinus formicarius*," communicated to the *Literary Gazette*, 24th March, 1827. He was one of the original members of the Entomological Society of London, and their first secretary; a paper read by him 6th January, 1834, on a "*Coleopterous Insect allied to Tomiscus*," was published in the first volume of the *Transactions*. There is scarcely an order of insects that has not been dealt with by Professor Westwood, and he wrote some papers on the Crustacea; in the years 1837-1842 he published an edition of Drury's *Illustrations of Natural History*, a work still of great value; in 1839-40 he produced his well-known *Introduction to the Modern Classification of Insects*, a most important aid to their study; in 1852 he produced a new edition of Wood's *Index Entomologicus*, but the works by which he is best known to English entomologists are *British Butterflies and their Transformations*, 1841, and *British Moths and their Transformations*, 1843 and 1845; the plates of the volumes were by N. H. Humphreys. In his latter years Professor Westwood produced that magnificent work, *The Cabinet of Oriental Entomology*. It would fill a large octavo volume to give a full catalogue of his contributions to the literature of entomology, and the above must suffice as a faint indication of the value of his productions. It was not only as a writer on Entomology that he was so excellent, but most of his papers were illustrated by his own pencil in a most admirable manner. His industry was little short of marvellous; besides being so great a naturalist, he was a specialist in certain branches of Archaeology and Palæography, so much so, that a contemporary writing of his decease says, "To most people he is known chiefly as a writer on Archaeology and Palæography;" another contemporary writes "Books like the *Palæographia Sacra Pictoria*, and the *Facsimiles of the Miniatures and Ornaments of Anglo-Saxon and Irish MSS.* are extraordinary monuments of his combination of knowledge, industry, perception and skill." To those who knew him he was one of the kindest of men, ever ready to impart his vast stores of knowledge; it may truly be said of the late learned Professor, "He was a man take him for all in all, I shall not look upon his like again." Professor Westwood received one of the gold medals of the Royal Society; he had been a Fellow of the Linnean Society since 1827; he filled Humboldt's place as a member of the Entomological Society of Paris, and received from the Entomological Society of London the highest honour it was in their power to bestow—that of Honorary Life President.—J. J. WEIR.





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THE GENUS *XANTHIA*:

WITH NOTES ON VARIATION, HABITS AND AFFINITIES.*

By J. W. TUTT, F.E.S.

The genus *Xanthia* and the species we usually ally with it, probably attract more attention from the collector than that of any other group of the NOCTUÆ. Their colours are attractive, and in our cabinet drawers immediately arrest the attention of anyone looking at them. The colour is in all the species of a yellow or orange shade, and it is not difficult to understand that their appearance in the imago state at the beginning of, or, in fact, well into the autumn months, and their habit of clinging to the leaves of the trees, or to the grasses and low plants at the base of the trees or bushes on which the larvæ feed, make these shades of colour especially useful as a protection when simulating the yellow leaves which at that time of the year hang so thickly in the spiders' webs, on the grass, etc.; and more than one of the food-plants of these species (e.g. willow and lime) are particularly noticeable for the bright yellow tint of the falling and newly-fallen leaves in the autumn. The darker lines and blotches on the wings aid the simulation still more strongly, and the exact resemblance which *Hoplorina croceago*, a supposed near ally to *Xanthia*, bears to the dead oak-leaf, into which it usually appears to crawl to spend the winter months, is particularly striking, and if we consider the great abundance of both *X. fulvago* and *X. flavago*, compared with the few specimens one meets at rest during the day, the completeness of their protective resemblance can be readily understood. Mr. Holland writes:—"The natural hiding-place of *fulvago* and *flavago* is among the long grass and herbage growing near the willows. In damp woods they are especially plentiful, and I often see them at dusk, struggling out of the tangled stuff beneath the willows, and crawling up to the tops of the long grasses,—hundreds of them, on some favourable nights,—and they may be readily looked over and boxed. They are not, however, always in the same humour, and on some nights they fly about a great deal. A few moths, odd ones, fall from the willow-bushes into the Bignell during the day, but not many rest there, and perhaps those found are moths which have just emerged and dried their

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wings." The yellow ground colour of the species of *Xanthia* is, as I have before remarked, varied with darker hues and blotches, and these are usually of a reddish, sometimes inclining to brown or purplish colour; and it is doubtful whether any British species of *Noctua* in their range of variation show more distinctly the gradation in the natural genetic sequence of colour—yellow, orange, red and purple—than do *X. fulvago* (*cerago*) and *X. aurago*. These two species are very variable, whilst the other species usually included in the genus *Xanthia*, are, as a rule, not given to much variation either in colour or markings.

Hoporina croceago is well separated from *Xanthia*, although there is a general tendency amongst collectors to include it among the "Sallow" moths; and this brings me at once to the consideration of the real nature of the alliance existing between these latter as represented in *Xanthia*. It appears certain, that whatever definition we may choose to make of the *Xanthidæ* and their allies, based on the consideration of such genera as *Orthosia*, *Anchocelis*, *Glæa*, &c., and represented by such species as *suspecta*, *lota*, *vaccinii* and *cerago* (*fulvago*) in various directions, that both *croceago* and *citrago* will have to be removed entirely from their present location and altogether away from the genus *Xanthia*, as including *fulvago* and *flavago*. Thus, speaking broadly, *Orthosia*, *Anchocelis*, *Dyschorista* and *Glæa* are all closely allied in different ways to *Xanthia*; but the two species in question not only show no true alliance to the species with which they are grouped, but little to the genera among which they are placed. The pupa of *croceago* is decidedly not *Xanthid*. The true *Xanthias* have pale larvæ, live in hiding (more or less) in trees when young, descending to the ground or hiding in bark when older; and having the peculiar markings and marblings characteristic of the larvæ of *fulvago*, *vaccinii*, *lota*, &c.

We, of course, recognise at once the general similarity of the members included in *Xanthia*, and there is no doubt, that this "general similarity" has led to the genus being constituted as at present; but when we come to examine the species more closely, even although we still do so superficially, we note that even the arrangement of the transverse lines is different in *citrago* from that in the other species, and even in *aurago* there appears a general tendency in the same direction. So far as markings go, *fulvago*, *flavago* and *gilvago* are very closely alike; *aurago* has the transverse lines very similar, but, whilst in the three former species the elbowed line is lost in the transverse fascia, in *aurago* it becomes distinctly the boundary of the blotch between it and the subterminal line, and, in the same manner, the comparatively indistinct subterminal of the first three are replaced in *aurago* by a very distinct subterminal. This, however, is a minor matter, but it sets one thinking, and so struck was I with the dissimilarity of the markings of *citrago* that I appealed to Dr. Chapman about the matter. He, at once, sent me drawings of the pupal anal segments of a typical *Xanthia* and of *citrago*, and whilst the former is almost identical with *Glæa* (*Cerastis*), the latter bears no resemblance to it whatever. and is, in fact, much more like a terminal of *Cuspidia* (one of the sections of *Acronycta*) than anything with which it is usually classed. It is not even like those of *Tæniocampa*, which are much like those of *Hadena*, and very distinct from those of *Orthosia* (*Glæa*, *Xanthia*, etc.). I feel satisfied that *citrago* has no real affinities with *Xanthia*, and that

its approximation in colour is due to a common habit at the same time of the year, and that this is needed for protection, and is no sign of actual close affinity. I have no information about *X. aurago*, but, although I am much less struck with the imago differences than I was with *citrigo*, I should not be surprised that its early stages showed some considerable differences from the other three members of the genus.

Hoporina croceago.—This is of course never included in the genus *Xanthia*, although generally classified very nearly to it. It is a very beautiful species, and in a manner striking, with its thoracic crest set up prominently, and with its white-ringed legs and white-spotted costa. There are no very striking points about the markings, and the colour is particularly invariable in fresh specimens. There are, however, two named varieties. In one of these the ground colour is dark reddish, instead of the normal bright orange colour = *fulvago*, Hb., and Mr. Nicholson refers to specimens from North Wales, being of a dull brick-red colour. This is probably due to a thick sprinkling of dark fuscous scales, as our ordinary British specimens are frequently sprinkled with such, although never in specimens I have bred or received has this been sufficient to suffuse the whole wing area so as to make a striking variety. There is also a pale yellow variety in Southern Europe, which was named *corsica* by Mabille, who writes of it as "whitish-yellow," while, at the same time, he notices the general constancy of the species on the Continent. Staudinger writes of it:—"Pallidior, straminea." After hibernation the colour is much faded, and the dark markings stand out prominently. Specimens in very bad condition, too, have a superficial appearance of being melanic. One other minor form of variation is noticeable, that is, the tendency in some specimens to form a distinct central fascia, or, at any rate, a stronger mark than the ordinary line. In some it assumes a >-shape, in others, a Y-shape, the former being due to the central line starting from the inner margin, running towards the apex, and then suddenly turning back to the costa, between the stigmata, the latter to its bifurcation in the centre of the wing, the second branch being continued towards the apex. The white hind wings have occasionally a delicate rosy tint, such as one sometimes sees on the fore wings of *Cuspidia tridens*, *Noctua glareosa* and a few other species.

Croceago hibernates and comes to the fallows in early spring. Although faded in colour, it is remarkable how well the moth keeps its fringes throughout its hibernation, and how well it still simulates the dead oak leaves. The moths copulate in the early spring after hibernation, and the moth lays its eggs singly on the dead oak leaves which are still clinging to the tree. Dr. Chapman obtains a considerable number of eggs from moths in confinement, by enclosing them in a glass jar with dead oak leaves and twigs. Even then, the habit of laying singly is generally carried out, although under such restrictions, it is not surprising that one finds frequently three or four eggs in a batch. The larva hatches as the oak-buds begin to swell and prepare to burst into leaf, and the young larvæ rest along the veins of the leaves. It feeds up readily, even in our London gardens, and I have more than once successfully reared the species on some pigmy oaks in my own garden. The larva is full-fed in May, and goes down at once into the ground and forms a cocoon, but it remains in this a very consider-

able time before changing to a pupa. During this time, disturbance is almost fatal to the successful change of the larva into a pupa. I have known this period to last from the first week in June until the end of August. The insect remains in the pupal stage about six or eight weeks before emergence.

The species is well distributed in our southern and western counties, but does not appear to be taken anywhere commonly in the autumn. Rarely is it ever found at rest, but a few appear at the ivy blossom under favourable conditions. Birchall records it from County Wicklow, but I do not believe it has yet been recorded from any Scotch localities. Most of the specimens in our cabinets are bred from ova, which have been supplied by Dr. Chapman from Hereford, or by the Lewes collectors. Staudinger gives as its range on the Continent:—"Central Europe (except the Urals); Southern Sweden (?); N. Italy; Spain; N. Balkans."

(To be continued).

SCIENTIFIC NOTES.

ACIDALIA HUMILIATA, HUFN. (*OSSEATA*, HB.).—It is with pleasure that I am able by means of specimens captured by myself and brother, in the Isle of Wight, to confirm this species as British, and as distinct from the *Acidalia* known usually as *dilutaria*, Hb. or *interjectaria*, Gn. The species has long been considered doubtfully as British, but it has been the opinion of most of our leading lepidopterists, that the specimens recorded as *osseata*, have simply been varieties of *interjectaria* with an exceptionally red costa. A very complete article on the synonymy of *A. humiliata* = *osseata*, was published by Mr. Tutt, in *The Entomologist*, vol. xxii., No. 312. My attention having been principally directed to the *NOCTUÆ*, I am afraid that the *GEOMETRIDÆ* have to a certain extent been neglected in my collecting. Although I have been doubtful for some months as to the agreement of certain specimens of an *Acidalia* in my cabinet with *dilutaria*, which was the only species to which they could possibly be referred, and although these doubts were confirmed by friends when looking through my collection, yet the matter was not actively taken up until recently, when upon closer examination of the specimens at different times, with Messrs. C. G. Barrett, W. G. Sheldon and J. W. Tutt, their identity with the *osseata* of Hübner was established, as well as their well-marked points of differentiation from the common *A. dilutaria* of our lists. I have not found them at all plentiful, and fear that it has not as yet established a very firm foot-hold in our country, but it has occurred certainly during the last two seasons in the Isle of Wight, and also, I believe, in 1890, although very sparingly.—ALBERT J. HODGES.

As Mr. Hodges mentions, some years ago I worked out the synonymy of what has always proved a puzzle to British lepidopterists. I am not now prepared to go fully into the matter, but trust to prepare an article shortly, for our readers. Plate c., fig. 19, is a representation of one of Mr. Hodges' specimens, and from this it will be seen, that the wings are much narrower than in our commoner *interjectaria*; the costa, too, is, as Guenée remarks, of the colour of our postage stamp (that is, of course, our old red penny postage stamp). There are *interjectaria* with

reddish costæ, but the red has generally a tendency to brown. I have no doubt that the Messrs. Hodges with their great energy, will soon work up enough specimens to supply the want in our cabinets, and give our leading lepidopterists a genuine type for study.—J. W. TUTT.

DESCRIPTION OF PLATE C.

- 1.—*Chortodes morristi* = *C. bondii*, captured at Folkestone (In Coll. Tutt).
- 2.—*Tapinostola fulva*, Hb. var. *concolor*, Tutt—captured near Warrington (In Coll. Tutt).
- 3.—*Tapinostola concolor*, Gn. (= *extrema*, Hb.?)—captured by Capt. Vipan in Hunts (In Coll. Hodges).
- 4.—*Caradrina ambigua*, Fab.—captured at Deal (In Coll. Tutt).
- 5.—*Caradrina superstes*, H.S., (? Tr.)—captured Freshwater (In Coll. Hodges).
- 6.—*Aphytoceros vagans*, Tutt (*Ent. Rec.*, I., p. 203)—taken at Chepstow (In Coll. J. Mason.)
- 7.—*Noctua festiva*, Hb. var. *conflua* (extreme form), H.S.—captured Perth (In Coll. Tutt).
- 8.—*Noctua festiva*, Hb. var. *mendica*, Fab.—captured Perth (In Coll. Tutt).
- 9.—*Noctua festiva*, Hb. var. *grisea*, Tutt—captured Darlington (In Coll. Tutt).
- 10.—*Noctua conflua*, Tr. var. *obsoleta*, Tutt—captured Shetlands (In Coll. Tutt).
- 11.—*Noctua conflua*, Tr.—captured Shetlands (In Coll. Tutt).
- 12.—*Laphygma exigua*, Hb.—captured Freshwater (In Coll. Hodges).
- 13-14.—*Abraxas grossulariata*, vars.—bred by Mr. Gee, Holloway (In Coll. Hodges).
- 15-18.—*Cobias edusa*, vars.—captured Freshwater, 1892 (In Coll. Hodges).
- 19.—*Acidalia humiliata*, Hufn. (= *osseata*, Hb.)—captured Freshwater (In Coll. Hodges).

In presenting Plate C to our readers, we trust that it will be of help to them in enabling them to recognise and discriminate some little known and rare species and varieties of British lepidoptera. Some of these we intend to make the subjects of separate articles in the near future, *i.e.*, as soon as our space will allow. At any rate, we feel sure that figures of such species as *C. ambigua* and *C. superstes*, *N. festiva* and *conflua* will be appreciated by those collectors without the advantages of their Metropolitan brethren.—ED.

NOTES ON *STAUROPOUS FAGI*.*—We have heard a great deal lately of 1892 having been a great "*edusa*" and "*saucia*" year, and I think it may further be claimed fairly that it was a great "*fagi*" year—and this fact offers a reasonable excuse for opening a discussion on *Stauropus fagi*. In these few scattered notes, or perhaps I ought rather to say, compilation of notes of this interesting species, it seems to me that the best method of procedure will be to take first the earliest stage of the insect, in fact to trace its history briefly from the cradle to the grave. Before entering upon the subject, I must, however, explain that Mr. Holland has supplied me with most of the notes on the habits of the species, both in its larval and perfect stages, and I am also greatly indebted to Dr. Buckell.

OVA.—*Manner in which ova are laid*.—With regard to the manner in which the eggs are laid, the Rev. Bernard Smith, in his interesting "Notes on the Notodontidæ" (*Entomologist*, xx., 290) says that the eggs are "laid singly under a leaf of beech or oak and may occasionally be found in shady spots." He also states that he has never found a second one on the same bush. Mr. Battley, however (*Entomologist's Record*, iii., 161) records the finding of 56 ova on a single beech trunk

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"scattered from about six inches from the ground up to eight feet on all sides of the tree, singly and in small groups." I asked Mr. Holland if he had ever seen the eggs on a tree trunk, and he replied that he had never met with the ova in a state of nature, but that Captain Robertson found some on the trunk of a tree in the same way as Mr. Battley. Mr. Holland continues in his letter, "May not the eggs in these cases have been laid by cripples? I find in the woods as well as in the breeding box there is always a small proportion of imperfectly developed moths which would not be able to move much. One thing is certain, wherever *fagi* lays its eggs, whether on trunks or leaves, the moth is actively on the move when ovipositing, so we should not expect to find the eggs in a batch close together." The same gentleman also writes to me:—"They (the ♀s) appeared quite unable to deposit eggs without being on the wing. Even the crippled ones went through the motion of flying as well as they were able." This seems to prove fully that the two instances mentioned above were accidental, and besides it would be curious, as Mr. Battley suggested, if the eggs were normally laid on the trunks where they are very conspicuous, that the fact should altogether have escaped observation. *Duration in ova stage*:—Mr. Holland says that the duration of the ova stage is usually about a fortnight if the weather suits, and that they hatch a few at a time as they are laid. *Colour when laid and colour changes of eggs*:—The late Mr. William Buckler (*Larvæ of British Butterflies and Moths*, ii., 65) gives a very minute and careful account of the colour changes of the ova, describing from two which he received from the Rev. Bernard Smith on the 27th June, 1877, and which were laid by a dark variety of the ♀. "The egg," he says, "was of a good size, circular, flattened a little beneath, and with a slight central depression above, the surface glistening as a pearl. Viewed through a strong lens it was seen to be most minutely pitted; it was cream coloured with a brown central spot in the depression above. On the morning of the 30th they were of a mottled appearance, reminding me of a full ripe greengage plum, some parts with a pinkish bloom, another part at the side like an internal blotch of a deep purple, a pale flesh coloured ring occupied the place of the previous brown central spot which had faded, and near this ring on one of the eggs now appeared smaller twin spots of purple. On the 1st July they changed to a deep purple nearly all over, with a small central spot of deep purple encircled by a paler halo of flesh colour. On the morning of July 2nd the eggs appeared clouded irregularly, and one larva hatched about 10.30 a.m. whilst I was looking at it."

LARVÆ.—Hatching:—Mrs. Bazett (*Ent. Record*, ii., 210) after detailing the colour changes of the egg, says, describing the emergence of the larva:—"Presently a minute black spot appears, it gets larger and larger, and with a glass you can see the head of the insect eating round the shell until the hole is large enough, when out bursts the head, and two pairs of long prolegs like those of an ant, and with this it wriggles about till one segment after another comes out, and it then looks more like an ant than anything else; these legs are for ever on the move, and the head rocks from side to side. First it eats its egg-shell, then sleeps, and walks about in search of food. For two days it appears only to eat the hairs on the leaves or on the brown stipules of the stems; the third day it attacks the leaves." They appear to require extremely little if any food for the first three days of their existence, in fact Mr. Holland kept some of his later ones

in the boxes where they were hatched without troubling to offer them any food until they changed their skins, and then put them into the breeding cage. Describing the newly emerged larva, Buckler says that "its length was $\frac{3}{16}$ of an inch, even with the posterior segments and filaments erect. In all respects, both as to form and colour, it presented a complete miniature representation of the adult larva. The head, the second, twelfth and thirteenth segments were dark brown, all the rest of the body and legs of a lighter reddish-brown, the entire surface very glossy." *Moult*s :—Buckler mentions two eggs which hatched 23rd July, larvæ moulted 28th, and again 6th August (becoming then much lighter than before), moulted yet again 29th August and spun up 17th September. There is also in the *Larvæ of British Butterflies*, etc., a very full and graphic account by Mr. Buckler of the last moult of a larva he was watching, which moult he describes as of a very protracted and exhausting character. He noticed on the 3rd September that the larva had fixed itself on a twig, and that it gently lifted the fore parts of the body up and down. Throughout the next day it rested with the first and occasionally the second pair of ventral prolegs raised. Mr. Buckler then describes the struggles of the larva during the moulting, on the 5th September, which commenced at 10.30 p.m. and ended at 12.50 a.m., a period of $2\frac{1}{4}$ hours. He states also that this last change of skin always takes place at night. *Adult Larva* :—The adult larva is, I expect, well known by every one in the room. A few points in its structure however deserve notice. The anterior legs are perhaps the first things which attract attention. The front pair are short, and appear to be used principally to guide the leaf whilst feeding. The second and third pairs are very long, rather thin, but slightly swollen at the joints, and when at rest are neatly folded back. I exhibit these legs mounted. The double humps on the back, too, are very conspicuous, 5, 6, 7, 8, 9 having these, but those on 8 and 9 are more rounded than those on 5, 6, 7. Those on the last named segments have at the apex a small spine or hook; 5 and 6 have each, in addition to the humps, a rather deeply cut crescent-shaped mark on the sides, which shines in certain lights with a dark iridescent green colour. 12 and 13 are much swollen and spread laterally, and there is a series of small dark greenish-black raised dots on the marginal line dividing the ventral from the dorsal area. The two anal filaments or tails are, like the crescent-shaped marks, purplish-brown in some lights and dark green in others. The adult larva may be said to be dimorphic—there is an ochreous-brown form and a dark-brown form. Occasionally, however, you get one intermediate in tint. The dark form is sometimes very dark, and has a purplish tinge. On looking at a number of the larvæ, the contrast between the two colours is very noticeable. The Rev. Bernard Smith, in his "Notes on the Notodontidæ," called attention to the dark variety. The "Walsingham Collection" at the Natural History Museum contains specimens of both forms. *Food Plants of Larva* :—From the number of food plants given by various authors, *fagi* would appear to be a general tree feeder. Stephens (*Illus. of Brit. Entomology*) gives beech, oak, hazel, birch, lime, alder and sloe. The Rev. Bernard Smith ("Notes on the Notodontidæ"), oak, beech, hazel and birch, and says they "have even occurred on wild rose and hawthorn," and states that it "will thrive well on apple." Mr. Holland (*Entom. Record*) mentions

that he finds them "mostly on beech, but some on birch and oak." He also records that some larvæ he was keeping fed up well, sleeved on apple. Godart (*Histoire Naturelle des Lépidoptères*) suggests that it may feed on elm, as he had twice found the larva at the foot of that tree. We have beaten them from beech, oak and willow, and fed up our larvæ on beech, which keeps very well if the branches are put in bottles of water. *Habits of Larva*:—With regard to the habits of the larva, I am sorry to say that its most noticeable habit in captivity seems to be pugnacity. Both the Rev. Bernard Smith and Mr. Holland note this trait in its character. The former, too, says that instances have occurred of cannibalism, but modifies the accusation by saying that this does not often happen. Our own larvæ behaved very much in the manner recorded by Mr. Holland (*Entom. Record*, ii., 227) of those he kept. They fought whenever they met, and numerous cripples were the result. Instances too occurred in which a larva lost a tail or a portion of a tail. They struck at one another quite savagely, swinging their bodies round with considerable force. Some few cripples pupated, as did some of Mr. Holland's. One poor fellow lost both his long legs on one side, and could not keep on the food; he died after crawling or wriggling pitifully about the bottom of the cage for some time. I am afraid the only really efficacious remedy for these bad habits is to keep each larva separately. The larvæ on a beech tree in a state of nature certainly need not annoy each other for want of space, especially as the ova seem to be laid in a scattered manner. Both the Rev. Bernard Smith and Mr. Holland concur in recommending searching for the larva in preference to beating. The larva, I believe, sticks very firmly to the small branches. My brother, who saw several beaten in the New Forest last year, tells me that a good proportion of these were either in the act of, or had just completed, a change of skin. Mr. Holland calls attention (*Ent. Record*, ii., 227) to the long period over which the larvæ may be found. In 1891, he took them full grown at the beginning of August, and yet found young ones in September. The larva takes about two months to feed up (Mr. H.) Mr. Holland also sends me most interesting notes on several other characteristics of the caterpillar. He tells me that the larva when disturbed ejects an acid like *Cerura vinula* does, and his friend, Mr. Hamm, was once made painfully aware of this fact by having the acid spurted into his eye. He also refers to the "trembling quivering attitude" which they take up when disturbed, and adds that "any one who beats out a larva for the first time will be sure to think he has crippled it with the beating stick, as it always appears about to expire in a fit of palsy." I believe the larva of *Notodonta trepida* behaves in the same curious manner. Most of my hearers will no doubt have seen the note in the last number of the *Record*, by Mr. Newnham, calling attention to the habit this larva has of drinking. Mr. Holland says that it likes to drink drops of water off its food, and that Mr. Hamm has repeatedly seen them doing this in the breeding cage. Mr. Holland thinks that "most likely they are in the habit of sucking up drops of dew on the leaves," and suggests that sprinkling the food in the breeding cage occasionally might be beneficial. *Protective resemblances*:—With reference to the protective resemblances of the larva, Mr. Holland has called my attention to their likeness "when at rest, to the brown scales on the beech twigs, and when moving, to the large wood ants, and, later on, to a dry curled-up leaf,"

the colour and appearance of which, from a short distance, they wonderfully resemble. Doubleday, Mrs. Bazett, and many others have remarked on the great likeness of the young larva to an ant, which is very striking.

METHOD OF PUPATION.—The Rev. Bernard Smith ("Notes on the Notodontidæ") states that "when full-fed, about September, it (the larva) falls from its food and spins up between leaves forming a rough cocoon." Mr. Holland also describing the pupation says:—"Fagi did not spin up in the green leaves on the tree as Newman says, but always in dead leaves at the bottom of the sleeve, on the side of the sleeve itself, and in the woods I have found them crawling on the ground in search of a pupating place." Our own larvæ, which were kept in a large glass fern case, seemed to become very restless when full-fed, and all went on to the mould at the bottom and pupated amongst the leaves which were laid for them. It is astonishing how fast and far they can crawl when they are ready to spin up, and I should think it is very possible that in a state of nature they travel considerable distances. **Cocoon:**—The cocoon is thin and of a pale brownish-white colour. It is spun so closely and tightly to the leaves that on separating the leaf from the cocoon, the veins of the former can be seen distinctly impressed on the silk. There appears to be a kind of slight lining composed of a few loose threads. The old larval skin is very conspicuous in the cocoon, by reason of the large head, the two tails, and the two pairs of elongated legs.

PUPA.—The pupa is reddish-black with a very smooth and shining surface. The anal segments are rounded, and there is a large anal spine, which is curved backward and hooked. The usual duration of this stage is from September to May or June. Sometimes, however, it only lasts a month or two, but with this question of double-broodedness we will deal later. The Rev. Bernard Smith says, that the pupa does not lie over to a second season. **Best mode of keeping Pupæ:**—With regard to keeping the pupæ, Mr. Bernard Smith ("Notes on the Notos.") says "there is no necessity to keep the cocoons out of doors, but a moderately damp atmosphere is necessary." He also mentions that some "cut the end of the cocoon open about the beginning of June, as the imago sometimes cannot get out readily, especially if the cocoons are too dry," and adds, that to expose them to a shower early in June is good, if they are not cut. Mr. Holland informs me that he got a fair proportion of his to emerge by keeping them in an outhouse in a box half-filled with damp sand. He also advised me to be particular not to break open the cocoons. **Parasites:**—In a table prepared by Mr. G. Bignell, published in Buckler's *Larvæ*, two parasites are mentioned as having been bred from *S. fagi*. These are:—*Eurylabus larvatus*, Christ (bred by Wheeler), and *Ophion bombycivorous*, Gravenhorst (bred by F. Norgate and J. Standish). These are both hymenopterous parasites. *Eurylabus larvatus* is also recorded in the same place as from *Cerura vinula*. On the 5th December last, I took three dipterous pupæ from the cocoon of an Epping Forest larva. I forced them, and one appeared on the 11th of the same month, the others about the 22nd. The larvæ of these emerged from an almost circular hole in the wing case of the pupa. I have been unable to identify the species at the South Kensington Museum, but I was informed that it is one of the *Tachinidæ*—Sub-fam. *Tachininæ*.

IMAGO.—*Habits of the imago*:—It seems most natural to commence this section with the emergence of the perfect insect. The Rev. Bernard Smith (*Entomologist*, xx., 290) says that it usually emerges at about 10 p.m., and advises keeping the imago till the following evening, in order that its wings may dry thoroughly. The next question which arises is, where does *fagi* hide during the day? Mr. Holland wrote in 1891 (*Ent. Record*, ii., 227) that "it was found at all hours of the day, from early morning till dark, on all sides of the tree and at all heights from the ground." As to the first point our experience entirely agrees with that of Mr. Holland. The next point is as to the height from the ground. In the *Entomologist's Monthly Magazine* (2nd series, vol. ii. [vol. xxviii.] 236-7), Mr. Holland continuing his former notes on the subject of this species says that "the moths generally rest comfortably within reach, sometimes, however, they are high up," and continues, "occasionally they are found at the foot of the tree." I have made a few notes from our specimens, and the heights from the ground are, I think, fairly correct. They ranged from a minimum of about 6 in. (on a projecting root) to a maximum of 20 to 25 ft. The instance in which the distance was only 6 in. was, however, in the case of a specimen which, unfortunately, had one hind wing quite undeveloped. The usual height was from 3 to 6 or 7 ft. We now come to a question which seems to have excited a good deal of interest. On what size of tree does *fagi* most often rest? In his *Record* article, Mr. Holland stated that three out of four moths were found on small trees, but he did not attach much importance then to this fact, the beech woods at Reading being, he says, "cut severely, and there are 20 small trees to one of fair size." However, in the August number of the *Ent. Mo. Mag.*, Mr. Holland returns to this question, and says: "Last year I thought it was accidental to find *Stauropus fagi* resting so often on small trees, because we have a large proportion of small trees in our close-cut beech woods. This year, however, it has been my fortune to see more of this species than I have ever seen before, and I find it is not a matter of accident where they rest. They decidedly make a selection of the smaller trees and saplings to sit upon. It is unusual to find them—the males in particular—on anything larger than a small scaffold pole, and the more favourite tree is from the size of a hop-pole to that of a walking stick. The small tree need not be a beech, a young ash, thorn, nut-bush, dead stick, in fact, anything which stands upright in the beech-wood will do for *fagi*, so that it is not too large. The females are not found quite so constantly on young trees, perhaps because they are less active than the males, but when once they have flown, they also seem to prefer the smaller trees." In Epping Forest (at least, in those parts most frequented by this species), the conditions as to size of trees, are almost the exact opposite of those prevailing at Reading. The woods are not cut, the trunks are mostly very large and old, and have been polled, though now many years ago, and small saplings are quite the exception. Still we find that 9 out of 19 occurred on small trees, i.e., trees smaller than a scaffold pole. Of these nine specimens, six were ♂'s, and three ♀'s; two of the latter being worn. Mr. Holland, in his article (*E. M. M.*) still speaking of the preference shown by *S. fagi* for the small trees, goes on to say "This selection of trees may be a protection to the moth. The trunks of the large beech trees are very smooth and clean, and a large moth like this

is conspicuous on them; but the little trees are rugged and covered with knobs, large in proportion to the size of the tree, where branches have been taken off to make the tree grow shapely. *Fagi*, as it sits closely pressed to the tree, carefully balanced to the perpendicular, with its wings folded in a triangular shape, the hind wings projecting beyond the fore wings, after the fashion of *Gastropacha quercifolia*, looks wonderfully like one of these knobs. The blackish variety in particular is so like a knob on the tree, that a close examination is needed to detect it." This question of protection again assumes, I think, rather a different aspect in our Forest of Epping. On some of our large grey trunks, the ordinary form of *fagi* is admirably concealed, better indeed than the blackish form. On many of the smaller trees, however, the dark var. is certainly the better protected. Five of six specimens of the black var. which we have taken (three ♂s, two ♀s), have been on the smaller trunks, leaving only a single specimen (♂) from the larger and greyer trunks. Not a moth was taken from a well-grown unpollarded tree, which have as a rule, very smooth bark, and offer fewer opportunities of concealment than either the small ones, or the old rough-barked pollarded ones. The "spear" trees correspond I should think, with the larger ones of which Mr. Holland speaks. This habit of sitting on the smaller trunks, sticks, etc., on which the darker forms are the better protected, may, perhaps, I think, be suggested as one of the causes (advantages? Ed.) of melanism in this species. Any darkening of the trunks, etc., by moisture, or in Epping Forest by the smoke from London, would also, I suppose, tend to produce the same effect. Mr. Battley (as is known to the Members of this Society) exhibited some few meetings ago, one or two specimens from the New Forest, which were considerably paler than our usual Epping Forest form. Perhaps the pale lichen-covered trunks of the New Forest, may have something to do with this. I have seen no records of the blackish var. from the last-named locality, but Mr. Holland thinks that probably dark ones will be found there, when larger bags of the species are made. At present, I believe, the only localities from which this form is recorded, are Marlow and Reading—practically in the same belt of country—and Epping Forest. Perhaps, some gentleman present, can tell us of the occurrence of the variety elsewhere. In Epping Forest, we get a larger proportion of dark vars. than are taken at Reading. The other point which Mr. Holland raises in the above paragraph, viz.—the position in which it sits, is also interesting; they sit perfectly upright, the under wings projecting beyond the upper ones; the pattern of the fore wings being indeed continued on the front margin of the inferior wing. They also stretch out the front pair of legs beyond the head, which is deeply buried between them. *Flight*:—Now as to flight, Mr. Holland says (*Ent. Mo. Mag.*) that *fagi* is a "strong flier," but not much of a wanderer, and considers that the "lethargic female keeps the males near home" from its habit of "assembling," and remarks that "where one moth is found, others are generally near the spot." He records having taken four or five from one small tree, and eight or ten from a clump of young trees. We have not had the good luck to find more than one on a tree, but once found three within a few trees of one another. I heard, however, of one gentleman who found four one day last year, in the Forest, and of these, three sat on a single trunk. We have never seen *fagi* on the wing, naturally. One, however, that was at rest, was

startled by being touched on the head, and showed that they *can* fly; it flew very swiftly, almost in a straight line from the place on the trunk where it sat, to a point 30 or 40 yards off on the ground, and was found only by the sound of its falling amongst the dry leaves. The Rev. Bernard Smith considers wet seasons are favourable to the moth; in 1860 and 1862, he took more larvæ of this species than ever before or since. *Assembling*:—With regard to the habit of assembling, Mr. Bernard Smith ("Notes on the Notos.") says that a ♀ "taken into a wood, and hung up in a cage of muslin, will attract many males between 11 p.m. and 1 a.m., on a warm night." He states, however, that "the insect is difficult to pair," and that "the second night after the ♀ has emerged, seems the only favourable one." The same gentleman, in the *Ent. Record*, i., 67, gives a short account of an "assembling" expedition many years ago, when a ♀ was taken to an elevated spot on the ridge of a hill, and was hung in a muslin cage on the branch of an oak about four feet from the ground. The night of the expedition was "warm and still," and at "about 11 o'clock, a ♂ came flying past the cage, rapidly, and after three or four turns, allowed himself to be netted." About half-a-dozen were taken of some two dozen seen. Mr. Bernard Smith goes on to say "One was admitted into the cage, but strange to say, immediately became quiet, for this insect is very difficult to pair in confinement." Mr. Holland's experiences, however, do not bear out all these conclusions. His impression is, that possibly, Mr. Bernard Smith's strain is weak, from in-and-in breeding, and may not perhaps be depended on to act naturally. He writes, "I have always found them pair on the first night, and have had them sometimes emerge in the evening and copulate before they were quite dry, like *Liparis dispar*." I have touched on "oviposition," when dealing with the ova. Mr. Holland tells me that whenever he wanted eggs "he placed a ♀ in a good-sized cardboard box, where, as soon as it grew dark, she began to fly about and deposit eggs here and there about the box." "In no case," he continues, "were all the eggs laid in one night—several nights were needed to complete the business." Of three ♀ from which we got ova, one laid only eight and then died; another laid some twenty; and the remaining one 70 or so; but these two occupied several nights in ovipositing. The ♀ which laid the 70 did not commence laying until three days after capture, and was, when found, in very poor condition. *Light*:—I am indebted to Dr. Buckell for the following records of the occurrence of *S. fagi* at "light." I suppose the reason why we get so few records of captures at this attraction, is that the usual haunts of the species are far from the glare of town. In *Entomologist*, 1880 (p. 282), Mr. Pim records the capture of a specimen on a gas-lamp at Dulwich, on June 21st, 1880. In the *Zoologist* for 1843, Mr. J. W. Douglas records a specimen on a gas-lamp at Clapham Common, on May 7th, and Mr. Edward Doubleday records one on May 10th, at Mr. Low's Nursery, Upper Clapton, but suggests that it was probably brought in the pupal state in some moss from Hertford. In the *Ent. Mo. Mag.*, 1886, Mr. J. Hellins (either Exeter or Plymouth) took, on June 28th, a wasted ♂ sitting, in the middle of one of the lower panes of a dining-room window, at 9 a.m. A lamp had been burning in the room till midnight the previous night. And lastly, in the *Entomologist*, 1892, Mr. Christy notes the capture of a specimen in a moth-trap at Emsworth.

Date of Emergence :—Dealing with the date of emergence, Mr. Holland records captures in 1891 (*Ent. Record*), extending over a period of two months—from the “middle of May to middle July,”—and last year (*Ent. Mo. Mag.*) on dates from May 12th to July 6th (the date of writing). Our first captures were made during the first week in June; the last, during the first week in July. *Double-broodedness* :—This is, I think, the proper place to mention another habit of the species—a tendency to double-broodedness. In the “Current Notes” (*Ent. Record*, ii., 277), “an extensive partial double-brood” is mentioned as having occurred at Reading in October, 1892, the last specimen being captured on 6th November. “Last year,” quoting Mr. Holland once more, “several moths emerged in the pupa-box out of doors, in October and November last; and the Rev. Bernard Smith informs me that he also had some emerge about the same time from eggs I sent him, this being the first time he has ever had *fagi* emerge in the autumn.” Mr. Holland did not find any specimens of the second brood in the woods last year, but he says the weather was not often fit, and he was unable to go when it was. In November, when it became warmer, shooting was going on at Reading. We bred one specimen on December 2nd, and another on December 10th (the latter being a cripple) from eggs laid in June last. Both were ♀’s. The pupæ were kept in a cold room in company with a good many spring pupæ, but no other species emerged. *Distribution* :—*Fagi* appears to be taken in a great many localities in the south and south-west of England, and Mr. Tutt informs me that it occurs in the beech-woods round Cuxton in Kent; Plymouth appears to be the most westerly place mentioned. As we go northwards, into the Midlands, records get fewer, Worcester and Sherwood Forest (Morris) and Wyre Forest (*Ent. Record*, iii., 192) being the only ones I have noticed. Dr. Buckell tells me that the only person who has recorded *fagi* within our area is Mr. Sheldon, who mentioned it as rare at Shirley. The “light” records, it will have been noticed, have included Dulwich, Clapham Common and Upper Clapton (?). Mr. J. A. Edwards speaks of the capture of a ♀ on July 7th, 1869 (*Entomologist*, 1869) on palings in Richmond Park, and there is a capture noted in the *Zoologist* (p. 1043) on June 17th, 1845, at Hammersmith. On the Continent, Dr. Staudinger gives us localities : “Central Europe, Southern Sweden, Livonia, Catalonia, Piedmont, Corsica, Bulgaria, Ural, Armenia.” Godart says it is found commonly in Touraine and the north of France, but that it is rare in the neighbourhood of Paris. *Popular Name* :—Before mentioning a few of the descriptions etc., of this species seems a fitting place to show the origin of the popular name of the insect “The Lobster Moth.” Albin (*A Natural History of English Insects*, by Eleazar Albin) in 1724 figures the larva which, he says, “was taken on the hasle (hazel) in Norwood, near Dulwich, the 9th August. It was of a brownish orange colour. I have drawn it both in its moving and standing posture, the better to express its odd shape and manner from its look, which has some resemblance of a crustaceous fish, for which reason I have given it the name of the “Lobster” caterpillar. It was kept in a box with some of the branches of the hasle set in bottles with earth under them to facilitate its change, but I did not perceive it to eat. It spun itself up the 13th of the same month between the bottles, and died without changing.” Dr. Buckell, who was so kind as to give me this extract, tells me that the figures are very good, except

that the colour is rather bright. They are represented feeding on hazel. The French calls this species "L'écureuil" (the squirrel) and "Bombyx du Hêtre."

DESCRIPTIONS, ETC.—The Linnæan description of the species (*Syst. Naturæ*, Ed. xii., p. 816) is as follows:—" *Phalena Bombyx fagi*, No. 30. *P. Bombyx elinguis*, alis reversis rufo cinereis; fasciis duabus linearibus luteis flexuosis" (Wings reversed, of a reddish ash colour, with two linear bent yellowish fasciæ). This is our ordinary form of the species. There is, however, a good deal of colour variation in this form. Some specimens I have seen are pale grey and have the outer margin much whiter than others, while some may be said to be almost intermediate between the type and the black variety. Some specimens too, show a tendency to a dark band across the front wings. *Variation*:—Var. β . Markings as in type, but wings of a deep brownish black. I have been unable to find any description of this very distinct form. Staudinger in his *Catalog* enumerates no varieties. It was, I believe, discovered by the Rev. Bernard Smith at Marlow, but I do not know whether he gave it a varietal name. A strange aberration—a male with female antennæ—was exhibited by Mr. Adkin on behalf of Mrs. Hutchinson at the Sth. London Ent. Society's Meeting on December 16th, 1886 (*Ent.*, xx., 22). *Affinities*:—Linnaeus seems to have been rather in doubt as to the position of *fagi*, for in the *Fauna Suecica* (1761) he says: (No. 1113) "Antennæ visæ sunt noctuæ in speciminibus lectis, forte feminis, tamen ob habitum eam inter Bombyces retuli done certiora innotescant de insecto, nisi fugitivis oculis a me non viso" (The antennæ seem those of a Noctua in the specimens taken, especially in the females; nevertheless, on account of its general conformation I have set it down among the Bombyces, until more shall certainly be known about the insect, as I have only seen and examined it casually). The genus *Stauropus* was created by E. F. Germar in 1811 or 1812. His description of the genus (*Systematis Glossatorum Prodrômus*. *Sistens Bombycum species secundum oris partium, diversitatem in nova genera distributas*) is as follows:—"Palpi duo, reflexi, compressi hirsuti, biarticulati, articulo ultimo minuto. Lingua nulla. Antennæ filiformes (maris pectinatæ, apice nudæ)" and *S. fagi* was, of course, the type of the genus. Germar arranged the following genera thus:—*Notodonta* (Ochs.), *Pterostoma*, *Cerura* (Schrank, Latr.), *Stauropus*, *Endromis* (Ochs.), *Lasiocampa* (Schrank). Staudinger in his *Catalog* places the genus immediately following *Harpyra* (O.) at the head of the *Notodontidæ* thus:—*Harpyra*, O. (*Cerura*), *Stauropus*, Germar (*Cerura*, Schrank *Harpyra*, O.) In the *Entomologist Synonymic List*, *Stauropus* is placed with *Dicranura*, Latr. (*Cerura*, Schrank) in a separate family from the *Notodontidæ*—the *Dicranuridæ* of Boisduval. The British Museum collection of the *Notodontidæ* enumerates ten species, of which eight are represented. *Fagi* is the only European member of the genus, all the rest coming from the East—India, Ceylon, Java, China and Japan.—A. F. BAYNE, Cranbrook Park, Wood Green, N.

THE LARVA OF COCCYX MEMORIVAGA, WITH SOME NOTES RELATING TO THE PUPAL STRUCTURE.—In September last, I found in Sutherlandshire, the leaves of the *Arbutus uva-ursi* inhabited by a small lepidopterous mining larva, usually in one of the leaves of the rosette terminating the shorter shoots. The leaf was very obvious, being divided about the middle by a slightly oblique transverse line into a

basal green healthy portion, and a terminal that was red, brown or black, more or less variegated with the colours of dying leaves. The mine of the larva occupied the dividing line, and had often a slender branch or two into the terminal part of the leaf. The effect of captivity or of bringing them south was to make them feed up, which otherwise they ought not to have done till spring; and finally, at the end of November, a specimen of *Coccyx nemorivaga* emerged, and others have done so since. I find its habit of eating out the interior of the thick fleshy leaves of the bearberry, leaving colourless bladders of the cuticle is noted in *E.M.M.* vol. xxii., p. 65. I may add that bearberry being scarce, I supplied it with leaves of *Arbutus unedo*, which seemed to suit it equally well with its natural food. This mining habit in a *TORTRIX*, and especially its similarity in habit to *Ditula woodiana* in mistletoe, is interesting. The pupa is of ordinary *TORTRIX* pattern, with a simple row of spines at each margin of segments, and with long hairs along the margins of segments. These appear to be the post spiracular tubercles. The other circumspiracular and the trapezoidals are nearly as well represented. On the 13th segment four such hairs and on the 14th two, are still longer and have curved points, forming in fact the hooks of the anal armature. The great breadth of the anterior portion of the prothoracic segment (carrying the "glazed eye") is remarkable, and emphasises the interest attaching to this portion of the pupa. It has all the appearance of being a truly separate segment, of equal value with the others, and this will probably have to be conceded, but whether it is the anterior half of 1st thoracic thus proved to be double, or whether it is a subsegment of the head, remains to be seen. This segment does not exist, except as "glazed eye," in the pupa of (butterflies? or) *Macros* (*Obtectæ*), but all observers of lepidopterous larva are familiar with the double set of dorsal appendages (tubercles, hairs, &c.) on the 1st thoracic segment of *Macros* as of others.—T. A. CHAPMAN, Firbank, Hereford. *January, 1893.*

NOTES ON COLLECTING, Etc.

COLLECTING AT RICHMOND.—On November 5th I spent a rather successful afternoon at Richmond Park, a locality I had never visited for Coleoptera before, although so many good insects have or may be taken there. As I turned into the park through the gate at the bottom of Priory Lane, I noticed a felled tree, and by taking off what little loose bark there was I took four or five *Homalium vile* and a little reddish-yellow beetle, belonging to the *Trichopterygidae*; perhaps some more advanced coleopterist can give a shrewd guess as to its name. The next beetle resort was a large mass of fungus growing at the roots of one of the large oaks, from which I took a large quantity of common *Staphs.*, and also: *Homalota occulta* (1), *Aleochara mæsta*, with the elytra bright brownish; *Tryphylus suturalis* and a series of *Tetratoma fungorum*. As it was beginning to grow dusk I turned off to the right towards the Richmond Hill gate, intending to take a survey of that part of the park, but was prevented by the discovery of the washed-out remains of a dead bird. There was scarcely anything left save the bones and skin, and they were saturated with rain; but

I noticed a *Choleva* run out as I turned it over with my stick, and before I had finished my investigation I secured one *Homalota occulta*, and about 50 specimens of the *Choleva* genus, comprising a series of *C. grandicollis*, *C. fusca* and *C. kirbyi*, and also several *C. tristis*. On Boxing-day the weather being so very severe, I went again to Richmond Park, ostensibly to bring home the fungus I had looked through before, in the hope of finding some more beetles, especially, as by this time it would be very rotten, and the quantity of beetles in fungus is generally in the same ratio as its putridity. The fungus had to be thawed before looking through, but it yielded a good series of *Homalota occulta*, and also *Tryphyllus suturalis*, *Quedius cruentus*, &c. The insects taken under bark were few and far between, the best being *Opilus mollis* and *Quedius scitus*, and from a small piece of hard fungus I obtained *Cis nitidus* and *Cis micans*.—H. HEASLER, 17, Danby Street, Peckham.

TEPHROSIA CREPUSCULARIA IN SEPTEMBER.—Is not September an unusual time for this species to emerge from pupa? On May 26th, 1891, I received a large batch of ova from Mr. Mason of Clevedon. I cannot find any note in my diary as to the time of their hatching, nor of the date on which the first larvæ turned down, but the majority were down by the end of August, although a few fed much later—the last larva till as late as the middle of October. In all, I obtained about forty pupæ, which I kept out of doors. Of these, five produced moths of the pale (summer) form in early September. Unfortunately, a large percentage of the remaining pupæ died in the following spring, but about eight produced well-formed moths in April, 1892. These were all of the ochreous form, and slightly larger than those which emerged in September. I did not try to breed again from any of them, but I am puzzled as to how the larvæ would have acted had I succeeded in obtaining ova from the September emergences; when they would have hatched; when the larvæ would have fed up; and which form (light or ochreous) would they have produced?—F. H. WOLLEY DOD, Crowhill, Innerwick, E. Lothian. *January 24th*, 1893. [It is quite the usual thing, in our southern counties, for *T. crepuscularia* to act as did those of Mr. Wolley Dod. Almost every batch of ova of this species produces some larvæ which feed up and emerge in the autumn (from July to September), these being of a very pale grey type, whilst the remainder go over the winter and appear in the spring being of an ochreous coloration. The autumn specimens (I have had them in July and August) lay ova at once. These feed up rapidly, often overtaking their uncles and aunts; pupate at about the same time; and emerge, as a rule, the following spring, although a few very frequently emerge in captivity in September and October. These lay ova at once, and the larvæ produced try to pupate before the winter. If they fail, they are killed off, the larva not being able to hibernate. In nature, September emergences are most unusual.—ED.]

COLIAS EDUSA IN SCOTLAND.—In reading the City of London Entomological and Natural History Society's Report for 20th December, which appeared in the January number of the *Entomologist's Record*, etc., Mr. Battley mentioned seven *Colias edusa* that were captured in Scotland. He gives Perth as the northern limit. I have pleasure in giving a record of its appearance still further north. Mr. Tytler, Woodside, Aberdeen, caught a very good specimen flying in sunshine at Scotstown

Moor, Aberdeenshire, on the 29th August, 1892.—WILLIAM COWIE, 5, Canal Street, Aberdeen. *January 25th, 1892.*

RARE LEPIDOPTERA AT KING'S LYNN.—Although, individually, I have been unable to do much field work, this last season seems to have been a good one, especially for Micro-Lepidoptera, or I have been singularly fortunate in proportion to the small amount of time I have, been able to devote to collecting. Amongst other things *Gelechia tetragonella* appears to have been exceptionally abundant; I was, however, rather late for this insect, and did not get many good specimens, being in the locality in which it occurs on one occasion only. I made a journey to the coast for *Crambus alpinellus*, but the wind proved too boisterous, and I only took one example, which proved to be in fine condition. Near the town I again took *Stathmopoda pedella* (2), *Tinagma resplendellum* (1) and one *Bohemannia quadrimaculella*. The latter species I had not been able to get for three or four years, or since the time when some old alders (which used to yield the insect in some numbers) were cut down. I again managed to collect larvæ of *Tortrix lafawryana* and *T. decretama*, and bred a short series of each. But, perhaps, my best captures for 1892 are a series of *Steganoptycha pygmaea*, Hb. and 3 specimens of the rare *Halonota ravulana*, H.-S. Unfortunately, the time at my disposal for active field work was very limited, or, I have no doubt, the record for the year 1892 would have been exceptionally good for this district.—E. A. ATMORE, High Street, K. Lynn. *December, 1892.*

LEPIDOPTERA IN THE HASTINGS DISTRICT.—*Colibris edusa* has been particularly abundant in this district during August and September. I managed to secure five of the pale var. *helice*, and saw several others which, unfortunately, I missed. I also took four *Colibris hyale*, and saw a few more; it was decidedly scarce, as I did not see more than a dozen during the season. *Vanessa cardui* has been very abundant, as also was *Plusia gamma*. At sugar, during August and September, I took the following:—*Nonagria lutosa* (1), *Leucania pallens*, *Hydræcia nictitans** (common and variable), *Miana literosa* (scarce), *M. furuncula* (abundant and variable), *Cerigo cytherea* (few), *Apamea gemina*, *A. didyma*, (common). *Caradrina alsines*, *C. blanda*, *Xylophasia polyodon*, *X. lithæylea*, *Tryphæna pronuba* (abundant), *T. orbona* (comes), *Agrotis puta*, *A. suffusa*, *A. saucia* (all common and variable), *Noctua rubi*, *N. brunnea*, *N. plecta*, *N. c-nigrum*, *N. xanthographa* (all more or less common, especially the latter), *Dianthæcia cucubali* (2), *Plusia festuæ* (1), *Phlogophora meticulosa* (common), *Xylina petrificata* (1), *Anchocelis humosa*, *A. rufina*, *Hadena oleracea*, *H. chenopodii* (common), *Mania maura*, *M. typica*, *Euplexia lucipara* (one very fine var.), *Amphipyra tragopoginis*, *Hypera rostralis*, *Scopula ferrugalis*, also four or five species of *Depressaria*. By beating and netting at dusk, I took *Geometra papilionaria* (1), *Gnophos obscurata*, *Acidalia scutulata*, *A. incanaria*, *A. osseata* (? Ed.), *A. emarginata*, *Eupisteria heparata*, *Timandra amatoria*, *Emmelesia alchemillata*, *Melanthia albicollata*, *Platypteryx falcata*, *Nonagria typhæ*, *Stenia punctalis*, *Pionea stramentalis* (several), *Ebulea sambucalis*, *Platytes cerrussellus*, *Crambus prætelus*, *Phycis roborella*, *Homæosoma binævella*, *Eudotricha flammealis*, *Dictyopteryx holmiana*, *D. forskaleana*, *Trycheris mediana* (several on Umbelliferous

* These are *H. paludis* we find, Mr. Ford having kindly sent us specimens.—Ed.

plants), *Ephippiphora scutulana*, *Conchylis francillonana*, and very many others. At light, among many others, *Cidaria miata*, *C. silaceata*, *Eubolia cervinaria*, *Notodonta camelina*, *N. dictæoides*, *Ciliz spinula*, *Nonagria fulva*, *Anchocelis lunosa*, *Xanthia cerago*, *X. silago*, *X. ferruginea*, *Catacola nupta*, etc. The above are the result of a few evenings' collecting, as most of my time was devoted to Coleoptera.—A. FORD, Claremont House, Upper Tower Road, St. Leonard's-on-Sea, January 16th, 1893.

COLIAS EDUSA IN 1892.—I see Mr. Battley, in his remarks on *Colias edusa* in 1892, advocated the migratory theory to account for the appearance of this species so generally and in such numbers. It seems to me to be much too late in the day to discuss any other theory, and I thought entomologists had been generally agreed for, at least, the past twenty-five years, that such appearances could be satisfactorily accounted for in no other way. But Mr. Battley further suggested that Hampshire was the place of landing of all the early specimens which reached England last year. I was certainly under the impression that the landing had been effected at many places along the English coast; that it had extended over several days, probably; and that the specimens did not all come over in a compact body to one part and disperse themselves over the country afterwards. I was so much occupied with home work in the early summer, that I did not get out collecting very much, but my friend, Mr. Norman Halls, who was staying at Walton-on-the-Naze on the north-east Essex coast, early in June, says that he was astonished one day to find *edusa* all over the place, even in the streets, as he had seen none previously. They then seemed in a very exhausted condition, and he was able to pick them up easily with his fingers. The next day, however, they were much scarcer, and very difficult to capture. Later in the year, the specimens resulting from eggs laid by the immigrants, were very much commoner at various places on the coast than inland, and I conclude, therefore, that a large proportion of the females had laid eggs near the place where they landed, before proceeding further. Early in August, I was surprised at the large number which were to be seen on the salt marshes at the flowers of *Statice limonium* and *Aster tripolium*. *C. hyale*, which was much scarcer, seemed to be more confined to cliffs, railway embankments and clover-fields, and, curiously enough, I saw very few at lucerne flowers, though I visited them constantly in the vain hope of again taking *A. lathonia*.—W. H. HARWOOD, 2, Brooklyn Villas, Colchester.

HELIOTHIS ARMIGERA.—In 1891, Mr. Boden bred *Prodenia littoralis* from imported tomatoes, and in 1892 another specimen was bred and exhibited at the Lancs. and Cheshire Ent. Society's meeting in December. Early in 1892, Mr. Fox of the City of Lond. Ent. Soc. found larvæ feeding in tomatoes, and I suggested at the time that the larvæ were probably those of *P. littoralis*. However, Mr. Fox bred the moths, which he kindly gave to me, and they proved to be *Heliothis armigera*. In connection with this species, a paragraph by Prof. Smith is interesting. He writes of the larva under the name of "The Cornworm":—"This pest, the larva of *Heliothis armiger*, has been more than usually abundant during the past season in New Jersey. Its work on corn is well known, and is well illustrated in the plate accompanying this number. The ears were picked up at a husking in Cumberland County, and they

were, unfortunately, by no means exceptional specimens. The outer rows had been injured to a very considerable extent, but damage decreased rapidly towards the centre of the field, indicating that the insects had come on from the outside. But it was not on corn that the greatest money injury was caused by the pest, but on tomatoes. Dr. Riley has given a very characteristic figure of the larva on tomato, and I had abundant opportunity of verifying its fondness for the fruit or vegetable. Early tomatoes are a very important feature in the money crop of the farmers of southern New Jersey, and they force their plants along as rapidly as possible, to get the high prices ruling for early specimens. Late in June, and early in July, they realise as much for a quart, as they do a month later for a bushel. In 1892, more than 60 per cent. of the very earliest tomatoes were destroyed by this larva, and a money loss was caused totally disproportionate to the actual percentage of the crop injured. The same larva would sometimes enter two or even three tomatoes in succession, and, even where little eating was done, the rain and dew entering caused decay. Early in July the larvæ were maturing rapidly, and the next brood, finding an abundance of sweet corn, neglected the tomatoes, which were not disturbed; nor did I find the larvæ, except in corn, when this was available" (*Entom. News*, iv., pp. 10-11). There appears to be no doubt that the tomatoes from which *Prodenia littoralis* have been bred, have been imported from the Canary Isles or the Mediterranean littoral. It would, however, be interesting to learn whether we import tomatoes from America, and whether *Heliothis armigera* has probably been imported from that country. I notice that Professor Smith further states, that the insect is in the pupal stage during the winter in the United States; those bred by Mr. Fox were larvæ during the winter.—J. W. TUTT. *February*, 1892.

TIME OF EMERGENCE OF GNOPHRIA RUBRICOLLIS.—I have been much interested in Mr. Hewett's notes, in the January number, on *Gnophria rubricollis*. My experience has been much the same as his, except as to the time of appearance. Last year, I bred about 70 imagines from New Forest pupæ, they were kept out of doors in damp moss, the first emerged on May 13th and the last on May 29th, except one which emerged on June 4th. It would be interesting to know the locality of Mr. Hewett's insects as they appeared much later (June and July). Newman gives August, which seems to me much too late; Stainton's *Manual* gives June, while in the *Entomologist's Monthly Magazine*, vol. i., p. 49, Mr. William Buckler wrote: "I found it (*rubricollis*) swarming on a lichen-covered park paling, and reared a large number of the perfect insects, which appeared during the month of May." I always found mine drying their wings between 7 and 8 a.m. I have collected for several years in the New Forest, and although I have often taken and seen this imago in June, I never remember taking or seeing it as late as July.—REGINALD S. SELLON, The Hall, Sydenham, S.E. 4th February, 1893.

THE LARVÆ OF TANAGRA CHÆROPHYLLATA (ATRATA).—My friend, the late Howard Vaughan, of London, is credited with the discovery of this larva, upon the strength of a single example forwarded to Mr. Buckler, from which the moth was reared. I have always understood, however, that he took two larvæ, unknown to him, from one of which he bred the moth. This may have been in 1866, but, in looking over his diaries,

I find, under the date of 25th May, 1867: "One ? *chærophyllata* larva, Bishop's Wood," with an entry on the Monday (27th) "sent Buckler supposed *chærophyllata* larva." Now, he must have had some very strong grounds for believing that a larva picked up in a ride of a wood appertained to a particular moth, and what more strong than the supposition that it was identical with that found by him the previous year; but, however this might be, the discovery was not one of a single specimen, excepting upon that date. On the 28th is noted: "About a dozen *chærophyllata* larvæ" (with no note of interrogation). On the 29th: "Sent Buckler five larvæ of *chærophyllata*." On the 30th: "Seven larvæ *chærophyllata*, Bishop's Wood;" after which there are no records until the 17th June, when the imagos began to emerge. The diaries of the succeeding years record also larvæ captures, and the names of the entomologists to whom they were forwarded. I need not trouble you with these, as the extracts I have given are sufficient to show that this was a genuine discovery, and not the result of a single fluke.—SYDNEY WEBB, Maidstone House, Dover.

PECILOCAMPA POPULI.—Referring to the note on this insect, *ante*, vol. iii., p. 301, I may say that I have never seen it on the wing earlier than the second week in November, in this locality. This was about the time of its first appearance this autumn. During the third week, upwards of forty were taken at gas-lamps, some of them worn. I did not see a single specimen from the end of that week, until the end of the second week in this month (December). Since then I have been taking the insect in fine condition. As I have before noticed this singularity of emergence in past seasons, I have come to the conclusion that there are two distinct emergences every season in this locality, irrespective of changes of weather.—J. MASON, Clevedon Court Lodge, Somerset. *December, 1892.*

The earliest record I have of *P. populi*, was on the 1st of November, when a specimen was taken on a lamp in the neighbourhood of Rickmansworth.—A. W. MERA. *December, 1892.*

RARE INSECTS AT CLEVEDON.—In my previous note (*ante*, vol. iii., p. 284), I mentioned how numerous insects were at ivy. I am sorry to say that in consequence of a succession of keen frosty nights setting in shortly after that date, they became scarcer, and the autumn collecting has not been anything like so good as anticipated. I managed by dint of continued searching to pick up a few *Dasycampa rubiginea*, also three *Xylina semibrunnea*. The first *rubiginea* was captured on ivy on the 9th of November, the last specimens (a pair) on the 1st of December. Only once before (in 1887) have I taken the insect so late in the season, then at sugar. I tried sugar several times during the last week in November and first week in December, when the evenings were mild, but without success. Single specimens of the following insects have been taken for the first time this season in Clevedon, *viz.*, *Agrotis cinerea* var. *obscura* (just emerged, at rest on the grass); *Cucullia chamomillæ* (at rest on fence); *Aplecta advena* and *Campptogramma fluviala* at rest on a gas-lamp.—J. MASON, Clevedon Court Lodge, Somerset.

LEPIDOPTERA TAKEN AND BRED IN SWANSEA DISTRICT IN 1892.—During the past year, 1892, I have taken or bred the following insects in the neighbourhood of Swansea. Unfortunately, I was away from June 13th to July 9th, otherwise my list might have been much larger,

but on the whole, I think I have done fairly well. Butterflies were well represented, some species being very abundant. The following were observed or taken:—*Pieris brassicæ*, *P. rapæ*, *P. napi*, *Euchloë cardamines*, all common; *Colias hyale* (one seen); *C. edusa*, common, one var. *helice* taken; *Gonopteryx rhamni*, scarce; *Argynnis selene*, *A. euphrosyne*, both common; *A. paphia*, scarce; *Melitæa artemis*, abundant; *Vanessa urticæ*, *V. io*, *V. atalanta*, also abundant; *V. cardui*, rather scarce; *Pararge ægeria*, rare; *P. megæra*, *Satyrus semele*, *Epinephele janira*, *E. tithonus*, *Cænonympha pamphilus*, all common; *Thecla w-album*, one seen; *T. quercus*, *T. rubi*, *Polyommatus phlæas*, *Lycæna icarus*, *Thanaos tages*, *Hesperia thaumus*, *H. sylvanus*, all common. Altogether there was a total of 30 different species of *Diurni*. Among the moths, the following were observed or taken:—*Sphinx convolvuli*. Among the scarcer Sphinges I did best with this species, which was not at all rare; in all I took thirteen (one since I sent in my last note), hovering over the flowers of *Nicotiana*. The first was taken on August 20th, and last on the September 20th. Seven others have been taken within half a mile of this house, and others seen. I found they began to appear about 6.30 or 7 p.m., but are then more difficult to catch, as they seem more lively. Three were observed over one patch of the plant before it got dusk, either fighting or playing. The best time I think to take them, is between 9 and 10 p.m., when they look like birds hovering round, coming or going within a yard or two of the lamp, which they don't seem to mind in the slightest; my latest capture, I think, was about 11.30 p.m., and the gardener informed me that he had seen one at 3 p.m., in broad daylight, hovering over the same patch. I kept a ♀ alive for six weeks or more, in hopes of getting eggs, and was not disappointed, as she laid four before she died, which, however, I am afraid will prove infertile, as they have a shrivelled appearance. My other captures &c. among the Sphinges were:—*Sphinx ligustri* (two larvæ); *Deilephila livornica*, one hovering over rhododendrons on June 5th.; *Chærocampa porcellus*, fairly common over the rhododendrons and pinks; *C. elenor*, much scarcer at pinks; *Smerinthus populi*, larvæ rather common on poplars by sandhills; *Macroglossa stellatarum*, two imagines, hovering over flowers; *M. bombyliiformis*, rare at flowers; *Zygæna trifolii*, *filipendulæ*, common; some of the former have the five spots in each forewing, coalescent. A few *Halias prasinana* fell in the tray from nut, while beating for larvæ, and one *H. quercana*, came to light; *Nola cucullatella* came freely to the moth trap, and *N. confusalis* was not uncommon at rest on trees; two *Nudaria senex* put in an appearance at light; *Euchelia jacobææ* was fairly common, as also was *Arctia caya*; I took a ♀ *Spilosoma mendica* flying in the sunshine; she kindly obliged me with eggs, and *S. lubricipeda* and *S. menthastri* were very common in the trap; a few *Hepialus humuli*, *H. lupulinus* and *H. hectus* were observed hovering among the herbage at dusk. Some of the trees in the park bear traces of the work of the larvæ of *Cossus ligniperda*. *Psilura monacha* is very scarce here; I have only taken one ♀ in the last two years. I found a pair of *Dasychira pudibunda*, in cop., on a tree, and got a nice batch of eggs, oddly enough, about 90 per cent. of the larvæ, when nearly full-fed, were nearly black, instead of the normal apple-green colour. I observed a few ♂ *Orygia antiqua* flying about, and found one or two cocoons which had been covered with eggs by the ♀. *P. populi* is scarce at light, but I succeeded in taking one ♀ at trap, which

I think is unusual. The ♂s of *Bombyx rubi* were in abundance, rushing madly over the park, from 4 p.m. till dusk, when the ♀s came out and found their way to the moth trap. I have neither taken larvæ nor imagines of *Odonestis potatoaria*, but one day came across some eggs, and I have only found *Saturnia pavonia* in the larval state. *Platypteryx falcula* is the only "hooktip" I have observed in this district, and that is not at all common; *Cilix spinula* came to the moth trap both in May and August; larvæ of *Cerura vinula* were not uncommon on the same poplars on which *Smerinthus populi* larvæ were found. Sir John Llewellyn's gardener took two *Stauropus fagi* at rest, but I had not the luck to come across any. *Pterostoma palpina*, *Lophopteryx camelina*, *Notodonta dictæoides*, *N. ziczac*, *N. chaonia*, *N. dodonæa* and *Pygæra bucephala* were attracted by the moth trap, and larvæ of *Notodonta dromedarius*, *N. ziczac* and *Pygæra pigra* were taken, the last-named rather commonly. Among the sugar frequenters, *Gonophora derasa* and *Thyatira batis*, and *Asphalia diluta* put in an appearance. *Bryophila muralis* and *B. perla* were found on a wall between Swansea and Sketty. Larvæ of *Cuspidia tridens* and *C. psi*, were taken, also a single one of *C. alni*. *Viminia rumicis* was common, both at rest on posts by sandhills, and at sugar on the same posts. I also found about a dozen larvæ of it feeding on strawberry leaves, and a few on the small yellow rose-trees that grow on the sandhills. *Leucania conigera* and *L. turca* were scarce; *L. littoralis*, *L. comma*, *L. pallens* and *L. impura* being fairly common at sugar. Mr. Birkenhead informed me that he took *Leucania putrescens* in this district also, but I have not been fortunate enough to turn it up. *Tapinostola fulva* came to light, as also did *Gortyna ochracea*, sparingly, and I found a few pupæ of the latter inside the stems of *Eupatorium cannabinum*. *Hydræcia nictitans* was very abundant at light and flowers, particularly the ornamental heath, and some very nice forms were obtained, hundreds being turned away from my moth trap; an occasional *H. mica-cæa* also visited the trap. *Xylophasia rurea* and its var. *combusta*, as well as *X. lithoxylea* were plentiful round the rhododendrons, whilst *X. hepatica*, and *X. scolopacina* (only three of the latter) came to sugar; *X. monoglyphæ*, as usual, being a perfect nuisance, knocking the rarer moths off. *Heliophobus popularis* tried to monopolize the trap, but without success, as a fair sprinkling of *Charæas graminis*, *Luperina testacea* and *L. cespitis* found their way in. *Mamestra albicolon*, *M. brassicæ*, *M. persicariæ*, *Apamea basilinea*, *A. gemina* and a very nice form between it and var. *remissa*, *A. didyma*, *Miana strigilis*, *M. fasciuncula*, *M. literosa* and *M. bicoloria* came to sugar, and *Chortodes arcuosa* to light, as also did *Grammesia trigrammica*, *Caradrina morpheus*, *C. alsines*, *C. taraxaci*, *C. quadripunctata* and *Rusina tenebrosa*; some very fine dark specimens of the last-named species being taken. *Agrotis vestigialis* was taken by shaking the overhanging roots of the sand-rush. I obtained one beautiful form by this means, the whole of the fore wings being suffused with pink; *Agrotis suffusa*, *A. saucia*, *A. segetum* (some black), and *A. exclamationis* came freely to sugar, with an occasional *A. corticea*, *A. ripæ*, *A. nigricans*, *A. tritici* and *Lycophotia strigula*. I took three or four *A. præcox* in the same way as *A. vestigialis* was captured, two also were taken, one at rest on the house, and the other stuck to the wax of a candle in a bedroom; how they came that distance I don't know, unless it was the light that attracted them, as the house is at least a mile from the sea, as the crow flies. I took two *Noctua glareosa* at sugar;

N. augur, *N. plecta* and *N. c-nigrum* occurring commonly at the same. A few *N. ditrapezium* came to the moth trap, and *N. brunnea*, *N. festiva*, *N. rubi*, *N. umbrosa*, *N. baja*, *N. castanea* (1), *Triphæna janthina*, *T. interjecta* (1), *T. orbona*, *T. pronuba* (some very nice forms), *Amphipyra pyramidea*, *A. tragopoginis*. *Nænia typica* and *Mania maura*, also honoured the sweets. Among the swallow frequenters, I took *Panolis piniperda* (1), *Pachnobia rubricosa*, *Tæniocampa gothica*, *T. incerta*, *T. stabilis*, *T. gracilis*, *T. munda* and *T. pulverulenta*. *Orthosia suspecta*, which I believe is new to this district, was turned up by Mr. Holland. *O. lota*, *O. macilentæ*, *Anchocelis rufina*, *A. pistacina* and *A. litura* were captured at ivy and sugar, as also were *Orrhodia vacciniæ*, *O. spadicea* and *Scopelosoma satellitia*, some beautifully marked forms of *O. vacciniæ* being obtained. *Anchocelis lunosa* was a very common visitor to the moth trap. In one night I took 47 specimens, some beautiful varieties being among them, from dark purplish-brown to cream colour. Larvæ of *Xanthia fulvago* and *X. flavago* were abundant in the catkins of the swallow. I took a great many in the hope of breeding some varieties of the former, and though I fed them with different kinds ofallows and low plants, was unsuccessful. *Mellinia circellaris* was common, both at sugar and ivy, though very worn during the latter part of the time, as ivy is very late blooming near here. On May 12th, at Gower, I took about half-a-dozen full-fed larvæ of *Cirrhædia xerampelina*, under moss on one tree; unfortunately I was unable to prosecute my search further on that day, and did not go to the same locality again for weeks, when I was unsuccessful. *Plastenis subtusa*, *P. retusa*, *Calymnia trapezina* and *C. pyralina* came to the moth trap, and the last-named also to sugar; my best night was on 24th July, when I took fourteen; the specimens that came to light were all more or less damaged; only a single specimen of *Calymnia affinis* put in an appearance, but that a ♀, which kindly laid me a nice batch of eggs. As to my doings with the genus *Dianthæcia*, I am not certain, but last year, I bred *Dianthæcia capsicola* and *D. cucubali*; this year, I have pupæ from *Lychnis sylvestris*, *L. dioica*, *L. flos-cuculi* and *Silene inflata*, but cannot tell what is in store for me. *Miselia oxyacanthæ* came to light and sugar, but no variety *capricina*. *Agriopsis aprilina* was taken at rest, and also in the larval state. *Euplexia lucipara*, *Phlogophora meticulosa*, *Aplecta prasina*, *A. nebulosa* and *Hadena protea* occurred at sugar, with *H. dentina* and *H. oleracea* commonly at the flowers of rhododendrons; and *H. pisi* and *H. thalassina* came to light. *Xylocampa areola* was taken rather commonly at rest on trees and fences, and also flying round theallows, but oddly enough, I have never found it actually sucking the honey from the catkins, as it seems much too lively to be caught napping, like the other swallow frequenters. *Calocampa vetusta* and *C. exoleta* were also taken, the former at ivy, and the latter at sugar. *Xylina ornithopus* was taken very sparingly at rest and sugar, but not one put in an appearance at ivy. Larvæ of *Cucullia verbasci* were fairly common on *Verbascum lychnitis* and *Scrophularia aquatica*, whilst imagines of *C. umbratica* were very scarce this year. I took *Gonoptera libatrix* at sugar, and also the larvæ on willow. *Habrostola tripartita* and *H. triplasia* came to the flowers of the snowberry. Thanks to Mr. Farren's timely hints, I succeeded in breeding a very nice series of *Plusia chryson*; the larvæ were taken the first week in June, and sleeved on growing plants of *Eupatorium cannabinum*; two imagines also came to my moth trap, which

was placed at some distance from where I found the larvæ, and the plant grows nearly everywhere round here. I also took *P. chrysitis* at light, and *P. iota* and *P. pulchra* at various flowers and at rest. *P. gamma*, as usual, was a dreadful nuisance, and often disappointed me, when I thought I had marked a *P. chryson* down. *Heliaca tenebrata* put in an appearance, though it was far from common, whilst *Hydrelia unca* was rather common though local, it being very difficult to obtain in perfect condition; about 90 per cent. have some slight defect, generally a chipped wing; sometimes an antenna gone; this may be accounted for by the reckless way in which they fly, one having actually impaled himself on a gorse prickle. *Phytometra viridaria* occurred both in the park and on the cliffs, the specimens from the latter place being much brighter in colour than the park ones. *Euclidia mi* and *E. glyphica* were both common in rough meadows, and *Toxocampa pastinum* was also taken in the same place. *Rivula sericealis* occurred sparingly in the same localities as *Hydrelia unca*. *Zanclognatha grisealis* and *Z. tarsipennalis* were not uncommon, and beating the hedges in the neighbourhood of nettles produced clouds of *Hypena proboscidealis*. *Hyphenodes costestrigalis* came to light and sugar, my best take being five in one night. Amongst the GEOMETRÆ, *Uropteryx sambucaria* was common, flying about at dusk; *Epione apiciaria* and *E. advenaria*, rare; *Rumia luteolata*, and *Metrocampa margaritaria*, common; *Ellopiæ prosapiaria* and *Eurymene dolobraria*, occasionally visited the trap; a few larvæ of *Pericallia syringaria* were taken from privet. *Silenia bilmaria*, *S. lunaria*, *S. tetralunaria*, *Odontopera bidentata*, *Crocallis elingularia*, *Eugonia albiaria*, *E. erosaria*, *E. quercinaria* and *Himera pennaria*, all came to light. *Amphidasys strataria* and *A. betularia* were taken at rest, and also in the moth trap. *Boarmia repandata* and its var. *conversaria*, *B. gemmaria*, *Tephrosia consonaria*, *T. crepuscularia*, *T. biundularia* and *T. punctulata* were taken at rest; the four species of *Tephrosia* commonly; some beautiful black forms of *T. crepuscularia* and *T. biundularia* being obtained. *Pseudoterpna pruinata* occurred on the cliffs, and I got two specimens that very nearly approach blue, being entirely different in colour from the ordinary type. *Geometra papilionaria*, *Iodis lactearia* and *Zonosoma porata* came to the trap, whilst *Asthena luteata*, *A. candidata*, *A. sylvata* (1), *Eupisteria oblitterata*, *Acidalia dimidiata* and *A. bisetata* were obtained by beating bushes, &c. *Acidalia immutata* was rather rare this year; *A. remutata*, *A. aversata* (banded form) and its commoner var.; *Cabera pusaria* and *C. exanthemaria* being common. I came across a red currant bush almost defoliated by larvæ of *Halia wataria*, and bred a nice series. *Strenia clathrata* was rare, but *Panagra petrararia* was kicked up at every step. *Ematurga atomaria* was not common, but *Bupalus piniaria* was abundant. *Abrazas grossulariata*, *Lomaspilis marginata*, *Hybernia rupicaprararia*, *H. leucophæaria*, *H. aurantiaria*, *H. marginaria*, *H. defoliaria*, *Anisopteryx æscularia*, *Cheimatobia brumata*, *Oporabia dilutata* all came to the trap. *Larentia didymata* was very abundant, flitting along the hedgerows at dusk, and also a nuisance, as no doubt a good many other Geometers were passed by in mistake for them. One *Larentia salicata* was found at rest, and *L. viridaria* was far from common. *Emmelesia alchemillata* and *E. decolorata* were scarce; *E. albulata*, common wherever the yellow rattle grew; one *E. unifasciata* visited the trap. Among the pugs, of which I am very ignorant, undoubted specimens of the following were taken: *Eupithecia pulchellata*, larvæ and at trap; *E. oblongata*, *E. subfulcata*,

E. castigata and *E. vulgata* all at the trap, and flying at dusk; *E. absynthiata*, *E. abbreviata*, common at rest, came also sparingly to trap and sawfly; *E. pumilata*, trap; *E. rectangulata*, one only, at rest on apple tree. *Lobophora viretata*, few seen, but only one taken off holly. *L. carpinata* at rest on various trees, but principally birch, on which it was very hard to distinguish them. *Thera variata*, *T. firmata* and *Hypsipetes trifasciata* were rare, whilst *H. sordidata* appeared everywhere, both the light green form and the black, of which I obtained some very nice varieties. *Melanthia bicolorata* was rather scarce this year, but *M. ocellata*, common, whilst only one *M. albicillata* came to light. I saw several *Melanippe hastata* in Clyne woods, but only succeeded in taking one, as they flew so high when once disturbed. *M. sociata*, *M. montanata* and *M. fluctuata* were all common, and *M. galiata* was occasionally to be found on the sandhills, but, as a rule, difficult to take, on account of the wind which usually prevails there. *Anticlea badiata* and *A. nigrofasciaria* were both rare, especially the former. *Coremia designata* was fairly common, but local; *C. ferrugata*, *C. unidentata* and *Camptogramma bilineata* all common. I was lucky enough to take one *Camptogramma fluviata* ♂ in the trap on August 19th. One *Eucosmia undulata* was beaten from oak; *Cidaria miata* was rare; *C. truncata*, *C. immanata*, *C. suffumata*, *C. silaceata* and *C. testata* were all fairly common at flowers and trap. One *C. prunata* came to light, and a few *C. pyraliata* and *Pelurga comitata* also to the trap; *C. fulvata* was common on the sandhills among the small yellow rose; *Eubolia limitata* and *E. palumbaria* were picked up in nearly all the rough meadows about the place; *Eubolia bipunctaria* occurred sparingly along the cliffs by Langland Bay; *Mesotype virgata* was very much scarcer this year than last, and *Anaitis plagiata* (which completes my list of macros) put in an appearance now and then at the moth trap, the second brood being the commoner of the two.—R. B. ROBERTSON, Sketty Park, Swansea. January 2nd, 1893.

PARTIAL DOUBLE-BROODEDNESS OF *SPILOSOMA FULIGINOSA*, ETC.—I had a brood of *S. fuliginosa* from a pair bred last spring (forced and emerging in April). The larvæ appeared full fed by July, but have lingered on till now, only a dozen or so having spun up. Those that spun emerged in about three weeks, and have been, without exception, ♀s; the remainder of the brood scarcely ever eat, but appear quite healthy. Is not this curious behaviour, and is the species regularly double-brooded, or did I affect them by starting them so early, forcing the parents? Some *Thyatira batis* ova obtained at Lyndhurst in June, produced imagines in August, only a couple of dozen or so of pupæ laying over for spring emergence. A quantity of *Clostera reclusa* pupæ are apparently healthy still, though they were pupæ by the second week in June, and many emerged in the third week. Can we suppose this division of emergence period in broods from one pair of parents is in order to assist cross fertilisation?—E. A. BOWLES. November 26th, 1892.

SPILOSOMA FULIGINOSA.—I captured a female *Spilosoma fuliginosa* on June 6th last year, which laid eggs the same day. These hatched on June 20th, and fed till the middle of September, when they suddenly ceased feeding. A second female was caught on June 21st; her ova hatched on July 6th, and the larvæ also fed till the end of September. Newman in his *British Moths* says:—"The perfect moth appears in

June and lays eggs before the end of the month; these are soon hatched and begin feeding on dock, plantain and several grasses, and are full-fed the first week in August, and turn to perfect moths about the end of the month." Both my broods are hybernating.—G. B. ROUTLEDGE, 50, Russell Square, W.C.

HABITS OF *PARNASSIUS APOLLO*.—It is strange to find *P. apollo* at the side of the water, at sea-level, when one has met with it before only at Alpine heights; but at Sweden I found it commonly in such positions flying about the hard *Sedum*-covered granite rocks which sloped down to the almost fresh, saltless sea water of Stockholm's Skärgården. The Alpine gentians, however, which were to be met with in the same localities as *apollo* frequently in Switzerland, did not grow in S. Sweden.—J. C. WARBURG. *October 3rd, 1892.*

HABITS OF *SPHINX CONVULVULI*.—I hope Capt. Robertson will settle the question of how *Sphinx convolvuli* passes the winter, and that he will get ova. I have never ventured to keep a female. I took two here this year, a worn one on August 30th, and one that was as fresh as an insect could be on September 27th. I watched my tobacco plants all through September and only those two came, but two more were taken by my boys, one on September 30th. One point with regard to collecting them is worthy of notice. They are much shyer than people imagine. On August 30th, I began to wait about rather before the time, and I saw my friend by accident, coming, after about a quarter of an hour's wait; he also saw me and my net and off he went. I took warning and retired out of sight under a big tree, and after fully ten minutes he returned and flew round and above the bed three or four times to make sure the coast was clear before he began feeding. Then he didn't care and let me approach. He went round the bed once and let me follow him cautiously, but made no effort to leave his supper. And then I remembered plainly that the only two I took last year were on evenings when I got back rather late and found them already feeding. All this may be fancy, but I should be glad to hear what other captors of the insect have to say. I have a certain amount of the large white wild convolvulus in my shrubbery, and have searched it at times and found no traces of larvæ. Does anyone know the habits of the species? It looks very much as if it hybernated in the imago. Certainly a larvæ of an insect fresh on September 30th, could not feed up before winter like the others of the genus. Nor can I think that my very fresh specimen had migrated.—G. M. A. HEWETT. *Winchester.*

CHECROCAMPA CELERIO AT NOTTINGHAM.—A specimen of this moth was captured on 12th October last by Mr. A. Pike, and exhibited at the last meeting of the Nottingham Entomological Society.—W. FERRIS, Nottingham.

CAMPTOGRAMMA FLUVIATA.—Noticing the rarity of *Camptogramma fluvata* referred to (*Ent. Rec.*, iii., p. 281) the capture of a single specimen (male) by myself, at a gas-lamp in Clifton, on the 27th of May last, may be of interest. From his description of the insect, I believe, that Mr. Chas. Bartlett met with one on the same night, also at light. R. M. PRIDEAUX, Ashted, Surrey. *January 8th, 1893.*

CAPTURE OF CHECROCAMPA CELERIO.—I may mention that in September, 1885, my wife took a specimen of this species in fine condition near Polegate, Sussex, while hovering over a bed of petunias, round which at the same time five or six *Sphinx convolvuli* were flying.—DOUGLAS H. PEARSON, The College, Chilwell, Notts. *January 18th, 1893.*

MICRA OSTRINA AND PARVA.—I have been reading with much interest the Appendix to Mr. Tutt's last vol. of the *British Noctue*. It may interest lepidopterists to know that the specimens of *Micra parva* and *ostrina*, taken by the late Dr. Battersby at Torquay, are still extant and in perfect condition in my cabinet. The specimens are very pale in tone, which of course may partly be owing to age, though the reddish-brown markings are distinct and well coloured. Treitschke's description applies very well, but there is no reddish-brown on the thorax or abdomen, which are of unicolorous putty colour. In the description of the fore wings of *parva*, one character seems to have been omitted, and which distinguishes it at once from *M. ostrina*, namely that the "white central area," or band, bearing the small discoidal spot, is bounded exteriorly by a brownish line bordered with white, which from the costa forms a broad loop to the mid wing, and thence runs parallel with the inner border of the band to the inner wing margin.—W. F. de V. KANE, Kingstown. February 6th, 1893.

PRACTICAL HINTS.

THE MONTH.—Providing the weather is tolerably mild, this month may be profitably occupied in searching for the wingless females of the genus *Hibernia*. In favourable localities, carefully search tree-trunks for ♀ *H. rupicaprararia*, ♂ at dusk, near hedge-rows. ♀ *H. leucophæaria*, tree-trunks; ♂ sometimes fly by day, and may also be found at rest, on trees and fences. ♀ *H. progemmaria* on tree-trunks; ♂ at dusk, also comes to light. *Anisopteryx æscularia*, females and males, on tree-trunks; preferring birch. *Phigalia pilosaria*, male and female, on tree-trunks; male also comes to light. The females of the above species are wingless, and sometimes very difficult to see; it is only by diligent practice, that the eye can detect anything beyond the lichen-covered tree-trunk, but when once the vision is acquired, considerable success usually follows. *Eriogaster lanestris* may be found on tree-trunks, near the ground. *Amphidasys prodromaria* at rest on trees and fences, also at light, end of month, whilst *Tephrosia crepuscularia* occurs at rest on trees. It will be well for the student to keep one or two females alive, of each species captured, in order to obtain ova, thereby enabling him to carefully study and record the complete life-history. J. P. MURCH.

During this month, warm evenings are occasionally suitable for sugaring; of course only "hibernated" Noctuxæ put in an appearance, but in cases where early and continuous frosts have precluded their flight, specimens are to be had in fair condition. I have thus taken the only *Calocampa exoleta* I have ever come across, some years ago, in North Oxfordshire, and with them, but in worse condition, large numbers of *Scopelosoma satellitia* and of course *Cerastis vaccinii*.

Pupa-digging is hardly worth pursuing, as the moles and other enemies have taken full advantage of their start over us, if we delay till spring, but larva-searching after dark, on the first really warm damp nights, after complete breaking up of frost, amply repays work, as most of the hibernating larvæ seem to take the opportunity to break their long rest, and crawl up to the top of any conspicuous stems amongst

the shorter growth, and may be easily found when searched for with a good lantern. In this way, *Triphæna fimbria* may be best obtained, with others of the genus, and most of the genus *Noctua*. Later on in the year, when larvæ are nearly full-fed, the work should be deferred till nearer midnight, when many good species may be beaten from sallow and birch, in numbers, including *Aplecta tincta*, *Noctua ditrapezium*, etc.—A. J. HODGES.

LARVA OF *CALAMIA LUTOSA*.—The following extract from my diary dated July 21st, 1881, concerning *C. lutosa* may interest some of your readers. Discovered larvæ of this species feeding in roots of *Arundo phragmites*; should be looked for early in July; pupæ, end of July to middle of August; larva feeds very deep in the roots, but when about to change, leaves the plant and pupates in the soil, two or three inches from the surface. The presence of the larva may be readily detected from the bleached appearance of the plants which have been attacked; the pupa, however, will be much more easily found than the larva, for which I have dug as deeply as a foot and then not reached it.—J. GARDNER, Hartlepool.

LABELLING.—While upon the subject of arranging and labelling, and with special reference to "locality data," we must call attention to an excellent suggestion received some time ago from Mr. A. J. Johnson of Birmingham, and which we regret want of space compels us now to summarise only. The main feature is, to secure a uniform system for collectors throughout the United Kingdom, by compiling and publishing a map divided into squares, each representing any small number of square miles that may be found most practicable; but all to be of equal size and numbered consecutively; or should this involve too high numbers for convenience, the map may be first divided into main sections to be indicated by different colours, and either corresponding with counties or not, as may be deemed most convenient; the numbers in each section could then commence at No. 1, and would be readily distinguishable by the colour. The label to be affixed to each specimen would correspond, firstly, in colour, to the section of map; and secondly, in number, to the smaller square in which it has been captured. Our correspondent further suggests that the labels could be issued in varying, easily distinguishable shapes, such as square, round, triangular, etc., which could be employed to indicate the state (whether larva, imago, etc.) in which the capture had been effected; and further, a printed capital letter upon the label could be the easily understood indication of the method of capture; thus "S" should refer to captures at "sugar," etc.

These labels (with the date of capture added) would then constitute a complete history of the field-work connected with each individual specimen, and, if thoroughly carried out, would be as satisfactory and complete a method as the older one of numbering the specimen only, and entering full data in one's own diary, with the additional advantage, that insects would as readily convey their history to all those interested, as to the original captor.

It is hardly necessary to point out the obvious difficulties attending the adoption of the above useful suggestion, the principal one of which would be the extreme difficulty of inducing lepidopterists to combine in adopting any universal system even of labelling; as has been proved in the far more important question of nomenclature and classification;

and without almost universal support, the system at once loses its chief merit. Further, the coloured labels are to us a great objection, unless kept too small to be of much practical use, as nothing but white should be employed by those who wish their collections to please the eye. The fact still remains that a plain, useful, abbreviated system of labelling is still a *desideratum*, and the thanks of all collectors are due to those who are willing to make public any improvements that may be thought of from time to time.—A. J. HODGES.

A DOUBLE SETTING BRISTLE.—As the season will soon be upon us, and with a view to facilitate the quick setting of lepidoptera, I venture to recommend a system I found very useful last season. Probably most entomologists use the setting bristles for holding the wings down, while they are being pulled forward. These, though very effective, necessitate the setting of one side first, or the use of two bristles. I have therefore made a bristle thus:—Take a piece of cork about 3/16-inch cube, push two bristles into it, very slightly diverging from each other in a V-shaped direction. Stick a pin through the cork at right angles to the bristles, fixing it with glue, and leaving about 3/8-inch beneath the cork. To use it, pin the moth on the board in the usual way, rest the point of the bristle-pin in the groove behind it, the bristles passing forward, one over each wing. Blow at the back of the insect's wings, sending them forward, and at the same time, tilt the head of the pin slightly forward, and press the point into the board. With two nicely balanced bristles, and a little practice, it is almost possible to get the wings into position without touching them, but any irregularities can be rectified with the setting needle. I find this system answers admirably with all insects up to the size of *Eurymene dolabraria*, and with a stiffer bristle, it is possible to set larger species.—A. U. BATTLE, 28, Amhurst Park, N.

WHITEWASHING CABINET DRAWERS.—In his seasonable paper on arranging cabinets, Mr. Hodges makes no mention of whitewash, so I should like to point out its great usefulness, not only when re-arranging old cabinets (instead of re-papering), but also to apply to new ones and boxes. The following recipe was given me some years ago by an experienced collector, and I have found it simply invaluable, and now apply it to all drawers and boxes, whether new or old, before use:—*Ingredients required:* 1.—Prepared chalk; 2.—A 2-oz. bottle of spirits of wine, in which 3 grains of corrosive sublimate is dissolved; 3.—A 2-oz. bottle 2 parts water, and 1 part carbolic acid; 4.—1-oz. whitest gum arabic, dissolved to consistency of oil. *Directions for mixing:*—Take an empty French plum jar and place enough prepared chalk in it to form, when settled, a deposit about 2 inches deep, chalk to be mixed with warm water, filling bottle to within 2 inches of top; add 1 tablespoonful of the corrosive sublimate, 1 ditto of the carbolic acid, and 2 ditto of the gum arabic: stir well, leave to settle for a day, skim off any particles that may rise to the surface. As the wash dries whiter than any paper, care should be taken to lay it smoothly, so as to avoid streakiness. This is easily managed by applying it with a good sized paint or paste brush, working one way only (say from side to side), and then taking at once a dry flat-brush (camel or hog hair), and working *lightly* in the opposite direction, keeping the drawer quite flat. The preparation is better made up fresh every 2 or 3 years. I get a chemist to make it up. Among its advantages are:—Firstly, prevention of mites, I have

known insects keep better in the most rubbishing old cabinets⁷ so treated, than in new ones of the very best London make, used as sent. Secondly:—Drawers so treated can be continually re-arranged with the minimum of trouble and best results as to appearance, and pencil lines (which after all work the best) can be freely used; for if ruled on the whitewash, a damp sponge will remove them and the whole coat in a minute, and a fresh one can be at once applied, which is dry in a few hours; or, if the lines are ruled on the paper, a coat of the wash will hide them and all discolorations, and fill up the pin holes, which is not done where silk threads are used, and shifted.—K. M. HINCHLIFF, Instow, N. Devon.

ENTOMOLOGICAL PINS.—Since the publication of my note on entomological pins in the *Ent. Record*, iii., p. 240, I have received from Messrs. Tayler and Co. of Birmingham, samples of an improved style of pin which they have manufactured lately, and I am sure that entomologists will gladly welcome this “new departure,” particularly after the many protests made in vain against the old pattern. The former unsightly heads have now disappeared, and in the new samples, the heads, which are of a far better shape, have been reduced to the smallest possible size that the excellent process of manufacture used by the firm will admit of. By this process the head is formed first, and the point is then ground true with the head; whereas by the ordinary method—which is responsible for so large a proportion of bad points—the point is formed first, and the head is added afterwards, and frequently at the expense of the point. These pins are now practically all that can be desired, as stiff as ever, with first-rate points, and heads, against which no objections can be heard. When “black-enamelled,” they are by far the best black pins that I have ever seen, and they have certainly “come as a boon and a blessing to men,” and particularly to those of us who share with some of the birds a partiality for “fly-catching.”—EUSTACE R. BANKES, The Rectory, Corfe Castle. *January 7th, 1893.*

CURRENT NOTES.

THE Sixtieth Annual Meeting of the Entomological Society of London was held on 18th January, 1893.—An Abstract of the Treasurer's accounts having been read by one of the Auditors, the Secretary, Mr. H. Goss, read the report of the Council. After the ballot, it was announced that the following gentlemen had been elected as Officers and Council for 1893:—President, Mr. Henry J. Elwes, F.L.S.; Treasurer, Mr. Robert McLachlan, F.R.S.; Secretaries, Mr. Herbert Goss, F.L.S. and the Rev. Canon Fowler, M.A., F.L.S.; Librarian, Mr. George C. Champion, F.Z.S.; and as other Members of the Council, Mr. C. G. Barrett, Mr. Charles J. Gahan, M.A., Mr. F. DuCane Godman, F.R.S., Mr. Frederic Merrifield, Mr. Osbert Salvin, M.A., F.R.S., Dr. David Sharp, M.A., F.R.S., Colonel Charles Swinhoe, M.A., F.L.S. and Mr. George H. Verrall. The President then delivered an Address, which, though containing reference to the Society's internal affairs, and an allusion to the successful resistance made by naturalists and others to the War Office scheme for establishing a rifle range in the New Forest, consisted for the most part of full obituary notices of

Fellows of the Society who had died during the year, special mention being made of Mr. Henry W. Bates, F.R.S., Professor Hermann C. C. Burmeister, M.D., Dr. Carl A. Dohrn, Mr. H. Berkeley-James, Mr. J. T. Harris, Sir Richard Owen, K.C.B., F.R.S., Mr. Henry T. Stainton, F.R.S., Mr. Howard Vaughan and Professor J. O. Westwood, M.A., the Hon. Life-President. A vote of thanks to the President having been proposed by Lord Walsingham, F.R.S. and seconded by Mr. J. H. Leech, Mr. Godman replied. Dr. D. Sharp, F.R.S., then proposed a vote of thanks to the Secretaries, Treasurer and Librarian, which was seconded by Mr. W. H. B. Fletcher. Mr. McLachlan, Mr. Goss and Canon Fowler then severally replied, and the proceedings terminated.

THE first Annual Exhibition of the North London Natural History Society was held in the Lecture Hall of the North-East London Institute, on the evening of Saturday, 7th January, when most branches of Natural History were represented in the exhibits. About twenty members showed cases of British Lepidoptera, including series of *C. edusa* taken last year (with examples of the var. *helice*) by Messrs. A. J. Hodges, L. B. Prout and C. B. Smith; also *C. hyale* by Mr. A. Quail. Among others were *T. subsequa*, by Messrs. A. J. Hodges (a series from the I. of Wight) and R. W. Robbins (from Lyndhurst); *A. iris*, from Lyndhurst, by Messrs. A. U. Battley and J. A. Simes; many beautiful *Papilio*s from British Columbia, by Mr. A. Rose; and some remarkable varieties of British species by Mr. F. G. Hanbury, F.E.S. Living larvæ and pupæ of Neuroptera were also shown by Mr. R. M. Wattson.

The place of the late Mr. H. T. Stainton on the editorial staff of the *Ent. Mo. Mag.* has been offered to and accepted by Lord Walsingham. Photographs of the late Professor Westwood and H. T. Stainton appear in the current number of that Magazine. That of Mr. T. D. A. Cockerell appears in the current number of the *British Naturalist*.

Little enough is known yet of the entomology of Ireland. Those interested in the fauna of the sister island will be pleased to see the list of Hemiptera taken in the north of Ireland by the Rev. W. F. Johnson, published in the current number of the *Ent. Mo. Mag.*

Mr. Bignell has detected a new species of *Pimpla* which he has named *epiræ*. He describes it from four females, bred July, 1891, from cocoons found in the egg-bag of the spider *Epeira cornuta* at Ivybridge.

Mr. Porritt describes the larva of, and Dr. Chapman gives some critical notes on, the affinity, as shown by the egg, larva and pupa, of *Dyechorista suspecta*. Dr. Chapman says:—"In larvæ and pupæ, the species of *Xanthia* and *Orthosia* differ from each other often in small matters only, and *Glæa* (*Orrhodia*) is not far off, but *suspecta* much more resembles *Glæa* than it does *Xanthia* or *Orthosia*, at least, as pupa, and as egg and young larva." This appears conclusive proof that its separation of *suspecta* from *Orthosia* generically, as has long been done on the Continent, is fully warranted.

Mr. Atmore records both *Steganoptycha pygmaeana* and *S. abiegana*, as well as *Halonota ravulana*, from the neighbourhood of King's Lynn. He also notes a probably new *Gelechia* from *Suaeda fruticosa*. Mr. Eustace Bankes records *Gelechia tetragonella* and *Micropteryx kalttenbachii* from the Isle of Purbeck.

Mr. J. E. Robson of Hartlepool, comes to London to read a paper

on "Melanism" at the next meeting of the City of London Ent. Society (Feb. 21st). The Society invites all entomologists (not members of the Society) to "The London Institution," Finsbury Square, on that date.

SOCIETIES.

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—The annual meeting of the Lancashire and Cheshire Entomological Society was held on Monday, January 9th, in the class-room of the Free Public Library, William Brown Street, Liverpool. Mr. S. J. Capper, F.L.S., F.E.S. (President), occupied the chair, and there was a good attendance. A number of interesting exhibits were laid on the table for inspection. The first business was the election of officers for the ensuing year. Mr. Capper was for the 17th time re-elected to the position of president; Mr. W. E. Sharp was appointed vice-president; Mr. F. N. Pierce, F.E.S., honorary secretary and treasurer; and Mr. C. H. H. Walker, librarian.

Mr. Walker, on behalf of the members of the society, said it was his pleasing duty to ask Mr. Capper to accept a handsome gold-mounted silver case containing a pair of gold entomological forceps (Applause). The society congratulated itself upon having again secured Mr. Capper as its president. During the 16 years he had presided over them he had sought only the advancement of the society, and had encouraged the members to take an interest in their studies (Hear, hear). They therefore desired to inaugurate that session by doing something more than merely thanking Mr. Capper for his past services; and they offered this slight token of regard, knowing that it would occupy an honoured place amongst his valuable collection (Applause). Mr. Capper, in acknowledging the gift, said that he thoroughly appreciated the kindness of the members, and would in future, as in the past, do all he could to benefit the society (Applause). Before proceeding to deliver his presidential address he referred to the death of Prof. Westwood. He then said:—Gentlemen,—You may remember that my address on a similar occasion last year was largely a record of my personal recollections of Entomology from my early childhood, being, indeed, my own entomological life history. The difficulties attending the study of Entomology some fifty years or so ago were contrasted with the facilities now at our command. The paucity of the literature (most of which was very expensive) with that we now possess, the apparent rarity of many species then, which, owing to our better knowledge of their habits, and the means of capturing them, are now abundant, and many similar contrasts. To-night I propose to leave the personal, and still further to pursue this subject, and shall preface my remarks by very briefly tracing the history of Entomology to the present century, and then lay before you a few important agencies which have done so much to facilitate the very great progress Entomology has since achieved. Aristotle, born in Greece B.C. 384, is acknowledged to be the most ancient author in whose books anything relating to Entomology now remains. Pliny the elder (who met with his death during the eruption of Vesuvius, which destroyed Pompeii, A.D. 79) wrote several works on natural history, some devoted to insects (bees particularly), but these contained little but what was copied from Aristotle. Entom-

ology, indeed, cannot be said to have been much studied till the 16th century, when attention was a good deal devoted to it. It was not, however, before the 17th century that much progress was made, or any important works on the subject were published. In a very interesting paper read before our Society by one of our members, Mr. Willoughby Gardner, April, 1880, entitled "The Rise of the Literature of Entomology," and which was published in *Science Gossip*, the author called our attention to a volume, *Theatrum Insectorum*, written in Latin, by Dr. Thomas Muffet, and published in London, A.D. 1634, in the reign of Charles I. Mr. Gardner, in calling our attention to this volume, informed us that it was the first work ever published on all Orders of insects as a separate volume. He was careful to state that several works had been written prior to this, treating of insects among other things, but this work of Muffet's was the first published on all Orders of insects. It was most carefully compiled, 406 authors, a list of whose names are given, being referred to. The work may indeed be said to be a complete record of everything previously known on the subject. Amongst others conspicuous in the 17th century, when much progress was made, were John Ray, born 1627, and his pupil Francis Willoughby. Some idea may be gathered of the progress Entomology has made since Ray's time, when it is stated that about the end of the 17th century, Ray estimated the whole number of insects in the world at 10,000 species, while Dr. John Davy, in 1853, estimates them at 250,000. W. F. Kirby, in his *Text Book of Entomology*, 1885, estimates the number of known British species as 12,600, and in the world, 220,000. In 1889, Dr. Sharp and Lord Walsingham's estimate reach nearly 2,000,000, whilst Professor Riley, in his new work just published at Washington, 1892, entitled *Directions for Collecting and Preserving Insects*, considers this estimate extremely low, and that 10,000,000 would be nearer. He arrives at this conclusion by stating that species have been best worked up in the most temperate parts of the globe, whilst in the more tropical portions a vast number of species still remain to be characterised and named, and that if we take into consideration the fact that many portions of the globe are yet unexplored entomologically, it is safe to estimate that not one-fifth of the species extant have yet been enumerated. In this view of the case, the species in our collections, whether described or undescribed, do not represent, perhaps, one-fifth of the whole. In other words, there are 10,000,000 species of insects in the world, and this, Professor Riley says, is, in his judgment, a moderate estimate. The popular estimation of Entomology in Ray's time may be gathered, when it is stated that the will of Lady Glanville was disputed on the ground of insanity simply from her love of insects. Moses Harris gives an account of this in his *Aurelian*, published in 1779, and says:—"The Fly, *Melitæa cinxia*, the Glanville Fritillary, took its name from the ingenious Lady Glanville, whose memory had liked to have suffered from her curiosity. Some relations that were disappointed by her will attempted to set it aside by acts of lunacy, for they suggested that none but those who were deprived of their senses would go in pursuit of butterflies. Her relations and legatees subpoenaed Dr. Sloan, founder of the British Museum, and Mr. John Ray, to support her character. The last-named went to Exeter, and at the trial satisfied the judge and jury of the lady's laudable inquiry into the wonderful works of Creation and established her will."

The progress of entomology was great in the 16th century. Prominent among its followers were Linnaeus, Fabricius, Donovan, Latreille, Hübner, &c., but early in the present century the study of entomology received a great impetus on account of the publication of so much elaborate and helpful literature. Amongst its most eminent authors were Curtis, Stephens, Westwood, Hewitson, Kirby, Spence, Guenée, Zeller, Douglas, Say, Signoret, Doubleday, Newman, Stainton and many others. The publication in 1815 of the *Introduction to the Study of Entomology* by Kirby and Spence did more to attract popular attention than any book before or since published. It is said that when Kirby and Spence commenced their task, the students of entomology were few and far between, one in Norfolk, another in Hull, half-a-dozen in London, and one or two more in other parts of Great Britain. In the preface to their work, they consider that the general ridicule with which entomology was then regarded, was the principal cause of the neglect of the science, also the want of elementary works, such as already existed on botany and kindred sciences. Curtis's translation of *Fundamenta Entomologiae*, published in 1772; Yeate's *Institutions of Entomology* which appeared the year after, and Barbut's *Genera insectorum*, 1781, were the only elementary works on entomology. Convinced that this was the chief obstacle to the spread of entomology in Britain, Kirby and Spence resolved to do what was in their power to remove it. At first their idea was simply to give a translation of one of the many introductions to entomology extant in Latin, German or French, adding only a few improvements, but happily they decided to attract the reader by relating the economy and natural history of its objects in a most interesting manner, by not simply recording the observations made by others, but by adding their own experiences formed in no contracted field of comparison. Indeed their observations and knowledge of insect life cannot fail to be admired by all who study their admirable work. The chapters devoted to insects beneficial and those injurious to mankind, with the best means then known for the encouragement of the one and the destruction of the other, were the first steps in the direction of economic entomology, now become so important. Whilst Kirby, Spence, and other writers were doing so much to advance the study of entomology, the establishment of entomological societies became an important element. England was the first country in Europe which possessed a purely entomological society, the earliest was formed in London in 1745, and was followed by several others. The *Societas Entomologica*, established 1806, was the first that published its transactions. It only lasted seven years. The Entomological Club, founded 1826, limited its number of members to eight, and is still in existence. On the 3rd May, 1833, nine gentlemen met, viz.:—Messrs. Children, J. E. Gray, G. R. Gray, Hope, Horsfield, Rudd, Stephens, Vigors and Yarrell, and resolved to found the Entomological Society of London, and on the 22nd May the following year, this society, consisting of 127 members, of whom 12 were honorary, was constituted. It now numbers 252 Fellows, of which 8 are honorary. The first meeting of the society was held at "The Thatched House," St. James Street, May 22nd, 1833. The Rev. W. Kirby was the first President. It has been applied to several times by the State to furnish information and advice on insect depredations. The society then appoints a committee of specialists to investigate the matter, and

in due time to report to the Government. A great event in the history of this society was the Royal Charter, which was granted it in 1885. Whilst this and other entomological societies were doing great scientific work, numerous working men were attracted by the great beauty of insects, especially the Lepidoptera, to making collections; not with a view of arranging them scientifically, but simply to make pictures of them. Of course, it is to be hoped now that such men have the opportunities of joining societies like our own, they will cease this practice, and study them more; still, there is no doubt but that these collectors did much to invite attention to entomological study. Kirby and Spence, as you are aware, very much commend their industry in this direction, and approve of their taste; contrasting the difference of spending their leisure in the country lanes in search of their specimens to spending it at a public house.

The Spittlefield Weavers may be considered the pioneers in this, and were renowned as Picture Makers. The Poet Crabbe, in "The Borough," 1810, thus describes them:—

"Oft have I smiled, the happy pride to see,
Of humble tradesmen in their evening glee,
When of some pleasing good possest
Each grew alert, was busy and was blest.
Whether the call-bird yield the hour's delight,
Or magnified in microscope the mite;
Or, whether tumblers, croppers, carriers, seize
The gentle mind—they rule it and they please.
There is my friend the Weaver, strong desires
Reign in his breast: 'tis beauty he admires.
See, to the shady grove he wings his way,
And feels in hope the rapture of the day—
Eager he looks, and soon to glad his eyes
From the sweet bower by nature formed, arise
Bright troops of virgin moths and fresh-born butterflies."

This taste for Natural History pursuits spread rapidly amongst the working classes, and twenty years ago "Picture Making" was quite the rage. Sheffield, Oldham, Stalybridge, Leeds and Wakefield were towns specially celebrated for this. The father of our Honorary Member, Mr. S. L. Mosley, was an indefatigable picture maker. He used to sell his pictures to adorn the rooms of public houses, &c., and on one occasion he had an order to cover the walls of a large room with them. In these pictures were ingeniously represented, by grouping insects together, lions, tigers, elephants, and many other devices. We cannot but regret the destruction thus caused to some of our most beautiful lepidoptera, nor is it surprising that some of these species are now rarities in localities where they once were abundant. However, as before remarked, such occupation was not without benefit. Many who began as picture makers have become men of science, and not least among these is Mr. S. L. Mosley, whose taste for natural history was acquired by collecting insects for his father and helping the picture making. I should like here to record the names of some of those men in our own counties, Lancashire and Cheshire, who were justly celebrated thirty years or so ago, and are still known as indefatigable observers and students of Entomology. They were none of them authors of elaborate works on the subject, but the magazines are full of their contributions and experiences. They were all ardent collectors of insects, particularly the lepidoptera, and not only collectors, but

keen students of their life histories. Amongst these were E. Birchall, N. Greening, Nicholas and Benjamin Cooke, C. S. Gregson, J. Chappell, J. B. Hodgkinson, R. S. Eddleston, A. Owen and J. Sidebotham. Rapid as the progress of Entomology has been during the past half century, in no direction has this been so great as in that which is called Economic Entomology, and this is owing to a very great extent to the indefatigable work done by Miss Ormerod, who began her active work in 1877, when she issued a pamphlet of eight pages entitled *Notes and Observations on Injurious Insects*, and this has been followed unremittingly since by yearly reports up to the present time. I believe for several years she conducted this work entirely on her own responsibility and at her own expense. In 1882 she was appointed Consulting Entomologist to the Royal Agricultural Society, but at her request the post was made honorary. Before Miss Ormerod's active work began, she studied injurious insects, galls, &c., and several papers of hers are scattered through the pages of *The Entomologist*. Miss Ormerod's love for insects was first inculcated when she was very young. I have been told that when she was young she was an invalid, and her nurse used to take her into the fields on her father's farm in Gloucestershire, and set her in a chair, where she used to sit and watch the insects by the half-day together. In 1881 she published her *Manual of Injurious Insects*, and a second edition in 1890, much enlarged. In the Winter 1883-4 she gave a course of ten lectures on Agricultural Entomology at South Kensington, and these were published under the title of *A Guide to Methods of Insect Life*, and this little book is the best on the subject that has ever been written. The book has recently been taken up by some County Councils and sold out, and a second and larger edition has been prepared, entitled *A Text Book of Agricultural Entomology* (1892). Miss Ormerod's work has extended to the Colonies, and in 1889 she published a volume of *Notes and Descriptions of a few Injurious Farm and Fruit Insects of South Africa*. She was instrumental in bringing forward the fact that the Hessian Fly, *Cecidomyia destructor*, had established itself as a British insect, and was applied to for information by the Australian Government, when the insect made its appearance there. She has served (probably still serves) as a Member of the Lords of Council on Education, and was the means of having the collection of Economic Entomology removed from Bethnal Green and re-modelled at South Kensington, Professor Westwood and Mr. Mosley being deputed to do the work. Miss Ormerod must have spent a very large sum of money in disseminating information on her subject. It is much to be regretted that latterly Miss Ormerod's health has given way, owing to the immense amount of care and anxiety necessitated by the task she has undertaken, so much so, indeed, that she has retired from the office of Consulting Entomologist to our Royal Agricultural Society, where it was a part of her duties to submit yearly an account of the insect attacks and the amount of enquiry on the subject sent to her officially. That she is still energetic in the cause was evinced by the circular she published in September last, and which, I believe, at first appeared in the *Times* newspaper, in which she gives the numerous reports made to her of insect attacks and depredations during the year. I would refer those interested in this subject to this circular. I am glad to say Miss Ormerod, though not officially, offers to continue the investigations in which she has been so eminently useful. Whilst

Miss Ormerod has been doing so much good work in Economic Entomology, others have not been idle, and Societies like our own have, as they ought to do, given it their special attention; but what we require, and what I trust we shall have before many years expire, is the appointment of a duly qualified State entomologist. I know we have Mr. Whitehead, to whom I have referred in a previous address, but the importance of the subject demands more than Mr. Whitehead is at present able to do. In the first place, I believe that the work he does for the nation is only that over and above what he devotes to his own business. In the next place, his attention has to be divided between purely agricultural matters and Entomology, and also he will not allow himself to be called an entomologist. We are very grateful for the work Mr. Whitehead is paid for doing, but it is not enough. We want a State entomologist supported by the nation. In America, as you know, Professor Riley holds such a position, and has done much good service, the immense damage caused to crops in the United States having rendered this a necessity; and I believe it is only from the ignorance of our Government of the terrible loss to the nation by insect havoc, that we have not long since followed the example. The directions already given by Miss Ormerod have saved the nation millions of money. Before she drew attention to the matter, Miss Ormerod estimated the loss from "Warble Fly," *Hypoderma bovis*, alone to be from four to six millions annually, and from the "Turnip Fly," *Haltica nemorum* and allies in 1881, £747,000. Mr. Mosley states that he is assured by the farmers around Alford in Lincolnshire that the annual damage done by the "Wheat Bulb Fly," *Hilemyia coarctata*, alone, within 10 miles of that town is certainly not less than £10,000, yet we can do nothing to check it because we do not yet know where or how it passes the year from May to March. In America they would despatch a man to the spot with orders to stay there until he had found it out. Professor Riley has under him a very efficient staff, and has a State laboratory where insect problems are worked out. As an instance of how they deal with attacks, when *Pieris rapæ* had been introduced, Professor Riley introduced its parasites and thereby put a check to its ravages. Several Marine Biological Stations have been started and received more or less government aid, but we want an Inland Biological Institution where Zoological and Botanical Problems could be worked out, especially with regard to insect depredations, and where farmers' sons could go for courses of practical instruction in such matters. While regretting that we have no State entomologist as in other countries named, it is gratifying to find that several County Councils having grants of money for Technical Instruction, regard Economic entomology as coming under this head, for they have appointed Entomologists as Lecturers—Mr. Newstead, for Cheshire; Mr. Enoch, for Essex; Mr. Hooper, for Worcester; Mr. Turnbull, for Aberdeen. I understand that some time ago a suggestion was made to Miss Ormerod by Mr. Mosley, viz., that we ought to have a number of Economic Entomologists employed as a kind of missionaries. Their duties should be to go from place to place, examining the state of the crops, etc., and to give instructions to farmers and farmers' men how to deal with the attacks. They could not only give evening lectures in schools, and day lessons to the elder pupils, but should go to the men working in the fields, and show them on the spot what it is that is

doing the mischief, and how to get rid of it. At such times as harvest and haymaking, lectures could be given to the men in the barn or hay-field. These suggestions of Mr. Mosley appear to me valuable, but they require to be carried out with caution. Unless these missionaries are well qualified for their work, they will do more harm than good, and I would rather trust to the free circulation among the farmers of such invaluable works on the subject as Miss Ormerod's *Text Book of Agricultural Entomology*. The difficulty, however, is to convince farmers of the importance of the study of insect attacks, and I am afraid very many, even if they were presented with the book, would not open its pages. Could not the question of County Council lectures be taken up by Government, and no person permitted to be employed by any Council until his knowledge had been tested, and the Government ought to appoint some person well qualified to be the examiner. Teachers of botany have to qualify themselves; why not teachers of entomology? In Australia, the State entomologist (Mr. French) writes that the authorities are most liberal to him; his reports are printed by the Government, and sent out free to farmers and growers. The Agent General has ordered from Mosley a collection of injurious insects, value £86, for Mr. French's private use, and they have placed as much of the Exhibition Buildings at Melbourne, covering 40 acres, as he may require for forming an Economic Museum, at his disposal. In America, the Agricultural Department have power to compile and print entomological books, even simple instructions in collecting and preserving insects, at Government expense. The attention at present paid to the study of Natural History at public and private schools must greatly facilitate its progress in the future. In my youth it was quite an exception where the scholars were encouraged to pursue it, and the making of a collection of insects, and studying their habits was hardly known. The Friends' School at York, and the one at Epping, where I went to school, were almost the only schools in the country, I believe, where Natural History was taught, whilst now all the larger schools possess a museum of their own, and many of them also, Natural History Societies, and there is scarcely one, I should think, in the country where some of the scholars do not collect. By the last Government code, the managers of an elementary school can dispense with grammar as a class subject, and substitute other subjects, one of which is Natural History. Advantage is to some extent being taken of this code, and the study of natural science is slowly but surely finding its way into our system of elementary education. We are educating the children more and more by things, and less and less by books. We are teaching them to find—

"Tongues in trees,
Books in the running brooks,
Sermons in stones,
And good in every thing."

At present, however, certain hindrances exist in the way of the more rapid progress of this knowledge. For instance, most teachers are very familiar with grammar, and to them it is an easy subject to take for a class; while, on the other hand, comparatively few are interested; or think themselves sufficiently advanced to take such subjects as entomology. Still, we are progressing, and this difficulty will gradually disappear, and, before long, there is no doubt, School Boards

will engage special teachers for Natural History. At Banbury, Cheshire, is a grammar school head teacher, Mr. Bailey, who takes a deep interest in Economic Entomology. His school is attended by farmers' children. He has breeding cases in the school windows, and encourages the children to observe. He has particularly called their attention to the Warble Fly, and has told them the life history of the Grub, and showed them how to squeeze it out of the hides. In 1885, one boy brought to the school 250 grubs from his father's farm; indeed, so energetic have the boys been, that this pest has been almost entirely eradicated from the district where it used to be a great scourge. In my educational collection I have a grub that was squeezed out by one of Mr. Bailey's scholars. Our Society has the honour to possess in the person of our Vice-President, the Rev. H. H. Higgins, a man who, during his time, has done perhaps as much as any one man, and a great deal more than many, to spread a love of Natural History. Amongst the many things, and, perhaps, one of the most useful things he has done, is the system of circulating cabinets, which he inaugurated, and which is now in vogue at the Liverpool Museum. These cabinets are fitted up with objects of Natural History, each cabinet illustrating one subject. A cabinet is sent out to a school and allowed to remain there for a time. Lessons upon the objects contained in the cabinet are given to the scholars by the teachers, and after it has remained a certain time it is taken away and sent to another school, and another cabinet is given in its place. This system is, perhaps, one of the most perfect yet devised, and is well calculated to spread that love for the works of creation and the Creator, which I am sure we all desire. I am told that this system is now being adopted in other towns. From an educational point of view, the value of this mode of instruction in Natural History cannot be too highly estimated. It is a kind of kinder-garten method, and more may be gathered by a short inspection and brief description than could be acquired by days of hard reading. The mention of the order given to Mr. Mosley for cases containing a collection of injurious insects for Australia, suggests my making a few remarks about himself. He is the son of a working man, and was led to the love and study of Natural History, as I have before stated, through assisting his father collecting insects for the purpose of picture making. He now devotes himself entirely to the advancement of Natural History, and a considerable portion of his life has been devoted, free of emolument, to its cause. His house, which is filled with specimens of Natural History, he has at all times thrown open to the public, inviting them to participate in what he himself so thoroughly enjoys and appreciates. He had notices posted in all the schools of the district that he would give freely to teachers any information he possessed if they would only seek it, and many apply to him for the loan of objects for lessons, for lectures, etc. to all of which he has given a free response, no one ever being refused. His house, too, is the rendezvous of naturalists from neighbouring towns, who gather together to look over his collections, get their specimens named, etc. For seven years he taught weekly in the Huddersfield Board Schools, and fitted up gratuitously one of the schools with cases. He has been empowered by the Government to fit up collections of injurious insects for South Kensington, Kew, Colony of Victoria; also for the Royal Dublin Museum, Edinburgh University, as well as for various Agricultural Colleges, Schools, etc., and has just

received an order from the Leeds School Board to fit up 600 small cases to give as prizes to the school children. These cases, some of which are before you, are remarkably cheap, and I think they only require to be known to school managers to ensure a wide circulation. You may feel sure it afforded me great gratification when Mr. Mosley told me some months ago that the inspection, twenty years ago, of my Educational Collection of Insects, which, I believe, was the first of the kind ever made, led him to the formation of these Educational and Life-History Collections for which he is so famous. Mr. Robert Newstead, another of our honorary members, has done much valuable work. We all appreciate the original papers he has read before our Society, and the interesting exhibits he has so frequently provided. He was appointed curator of the Grosvenor Museum, Chester, in the summer of 1886, when he commenced to work up the life histories of injurious insects, and has already provided the museum with sixty cases, each exhibiting one life-history. These have proved of great value as a teaching collection, and are much appreciated by the general public. In working out the injurious scale insects (*Coccidæ*), he found it impossible to make anything like headway with them without giving special attention to the Order; this he has done, and published in the *Entomologist's Monthly Magazine*, from time to time, descriptions of new species, species new to Britain, and new facts relating to these insects. Several of the new and rare species are from the Lancashire and Cheshire district, but the species cover a wide area. Indeed, he is at present helping Mr. Cockerell in working out the Jamaica species. As a lecturer on Economic Entomology, Mr. Newstead began in 1888 to give a series of lectures, at first on General Entomology, but in the year 1890, the committee of the Museum formed a Fruit and Vegetable Culture Class, at which he gave a course of instruction on the pests affecting these crops. In 1892 he delivered a series of lectures for the Cheshire County Council on "Fruit Pests," at ten centres in Cheshire, and these were so successful, that they have engaged him to deliver some 37 lectures on "Economic Entomology." A few weeks ago I had great pleasure in inspecting the local collections of insects at the Chester Museum, where I found Mr. Newstead. In addition to the work done and already described, he had also been an active collector; and, since he had been at the Museum, he had added about 1,000 local species collected by himself, consisting—for the most part—of the Orders COLEOPTERA, LEPIDOPTERA, HYMENOPTERA and HOMOPTERA.—My address, I fear, has been of a somewhat rambling nature, but I hope some of the subjects brought before your notice will be thought worthy of serious consideration and discussion. I would, before I close, congratulate our Society on its very healthy condition. It is satisfactory, at the close of its 16 years history, to be able to state that it never was in such a prosperous condition. The attendance has been numerous; the papers read, quite equal to those of the past; the discussions—in which more members joined—considerably improved; whilst, we never before had so many interesting exhibits. There is but one source of sorrow, and that is the great loss we have sustained through death of two of our members. Mr. Francis Archer, who died at his residence, 21, Mulgrave Street, Liverpool, February 29th last, after a week's illness, was one of the first members who joined our Society. He had not latterly attended many of our meetings, but he *always* took a deep interest in our prosperity. He was a born natural-

ist, and a most warm-hearted and kind friend. Some of you will remember, soon after the foundation of our Society, the very pleasant afternoon we spent at his house at Crosby, to which all the members were invited. Mr. T. J. Moore, who died October 31st last, was born in London, 1824. For many years past he had been the Curator of our Free Public Museum. He was one of the 11 gentlemen who met at my house, Huyton Park, February 24th, 1877, when the Lancashire and Cheshire Entomological Society was formed and christened. Time works change, and, with the exception of myself, he was the last of the original members, four having since died, and the rest have removed from Liverpool. I feel I must also express the deep regret all interested in Entomology feel in the great loss we have just sustained in the death of Mr. H. T. Stainton, which has deprived the world of one who has done almost more than any other man to forward the study of this science, and whose name must ever be associated with it, as the acknowledged authority on the Micro-Lepidoptera.

The President's address was greeted with the heartiest applause and approval. He then exhibited a melanic variety of *Timandra amatoria*. The specimen was unicolorous, composed of soft, olive-green scales. Mr. Gregson, a collection of autographs of naturalists, artists and authors, including nearly all the entomologists of the past 50 years. Mr. Walker, a drawer of varieties of North American *Vanessa antiopa*, probably the finest lot of varieties of this species extant. Mr. Collins, *Stauropus fagi* from Reading. Mr. Mosley, a set of educational cases relating to natural history subjects, to be used as prizes at schools. Mr. Newstead, a specimen of *Vanessa antiopa* captured in Cheshire in 1877 by Mr. Leather of Vale Royal.—F. N. PIERCE, Hon. Sec.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—17th January, 1893.—Exhibits:—Mr. Battley, bred specimens of *Argynnis paphia* and pupa of same, found in the New Forest, attached to the underside of a honeysuckle stem. He remarked that he had observed more than a dozen larvæ of this species, basking in the sun on a piece of moss, which they closely resemble in colour. Mr. Simes preserved larvæ of *Satyrus semele* from Sussex. He stated that these larvæ hid under leaves by day, and only become active in the evening, when they ascended the grass on which they fed. Mr. Clark, *Stauropus fagi*, from Epping and New Forest, also empty cocoons of the same. Mr. Bayne, *Stauropus fagi*, from Epping Forest, including the black variety; also pupæ, cocoons, parasites and coloured drawings of the larvæ. Mr. Riches, a series of *Cidaria dotata*, bred from larvæ found on red currant. He remarked that this species only passes a short time in the pupæ, several of his specimens having emerged before some of the others pupated. Captain Thompson, a specimen of *Dasypolia templi*, taken at rest, on a wall near Halifax, on 19th November. Mr. Prout stated that he had recently bred several *Melanthia ocellata*. The larvæ of this species spin light cocoons on the surface of the earth, in which they remain as larvæ for some time, but on pupating, the emergence of the imago soon followed, and did not seem to have any connection with the temperature. Mr. Sykes, a specimen of *Sirex gigas*, taken at Enfield in July, 1887.

Mr. Bayne then read his paper on *Stauropus fagi*. Messrs. Clark, Prout, Lewcock, Sykes, Battley and Simes, took part in the discussion that followed, and a vote of thanks was unanimously accorded to Mr. Bayne for his paper.

February 7th, 1893.—Exhibits:—Mr. Mera, a fine series of *Hybernia defoliaria*, pale ochreous, with a very clear dark band. These were all from one batch of eggs, and showed the effects of heredity, as almost every specimen was distinctly banded and followed the parent form, none of the usual unicolorous specimens were bred with them. Mr. Hockett bred specimens of *Hybernia defoliaria*. He remarked that these had emerged almost continuously from October, until the present time. Mr. Bellamy, *Ennomos tiliaria*, *E. fuscantaria*, *Selenia lunaria*, and some suffused specimens of *Himera pennaria*, all from Wood Green. Mr. Prout, several *Geometra*, with the transverse lines approximating, the enclosed band in some cases resolving itself into a line. These included specimens of *Ennomos angularia*, *Himera pennaria*, *Eupithecia abbreviata*, *Thera variata*, *Melanthia ocellata* and *Melanippe montanata*. Mr. Boden, *Coccyx strobilana*, *C. splendilulana*, *C. argyran*, *C. abiegana*, *C. nanana* and *C. vacciniina*, all from West Wickham. Mr. Gates, *Hypercallia christiella*, from Sevenoaks. Exhibits of the genus *Xanthia* were made by Messrs. Bacot, Battley, Boden, Clark, Gates, Hodges, Riches, Routledge, Sequeira, Southey and Tutt.

Mr. Tutt then read his paper on "The Genus *Xanthia*," after which there was an interesting discussion.—A. U. BATTLE and J. A. SIMES, *Hon. Secs.*

ENTOMOLOGICAL SOCIETY OF LONDON.—February 8th, 1893.—Mr. S. Stevens exhibited a specimen of *Chærocampa celerio*, in very fine condition, captured at light, in Hastings, on the 26th September last, by Mr. Johnson. Mr. A. J. Chitty exhibited specimens of *Gibbium scotias* and *Pentarthrum huttoni*, taken by Mr. Rye in a cellar in Shoe Lane. He stated that the *Gibbium scotias* lived in a mixture of beer and sawdust in the cellar, and that when this was cleared out the beetles disappeared. The *Pentarthrum huttoni* lived in wood in the cellar. Mr. McLachlan exhibited a large Noctuid moth, which had been placed in his hands by Mr. R. H. Scott, F.R.S., of the Meteorological Office. It was stated to have been taken at sea in the South Atlantic, in about lat. 28° S., long. 26° W. Colonel Swinhoe and the President made some remarks on the species, and on the migration of many species of Lepidoptera. Mr. W. F. H. Blandford exhibited larvæ and pupæ of *Rhynchophorus palmarum*, L., the Gru-gru Worm of the West Indian Islands, which is eaten as a delicacy by the negroes and by the French creoles of Martinique. He stated that the existence of post thoracic stigmata in the larva of a species of *Rhynchophorus* had been mentioned by Candèze, but denied by Leconte and Horn. They were certainly present in the larva of *R. palmarum*, but were very minute. He also exhibited a piece of a drawing board, showing extensive injury by Longicorn larvæ during a period extending over seven years. Mr. G. T. Porritt exhibited two varieties of *Arctia lubricipeda* from York; an olive-banded specimen of *Bombyx quercus* from Huddersfield; and a small melanic specimen of *Melanippe hastata* from Wharfedale Wood, Yorkshire. Mr. H. Goss exhibited a few species of Lepidoptera, Coleoptera, Hemiptera and Neuroptera, sent to him by Major G. H. Leatham, of the 31st Regiment, who had collected them last June and July, whilst on a shooting expedition in Kashmi territory, Bengal. Some of the specimens were taken by Major Leatham at an elevation of from 10,000 to 11,000 feet, but the majority were stated to have been collected in the Krishnye Valley, which drains the glaciers on the western slopes of the Nun Kun range. Mr. Elwes remarked that some

of the butterflies were of great interest. Mr. G. F. Hampson exhibited a curious form of *Parnassius*, taken by Sir Henry Jenkyns on the 29th of June last, in the Gasterthal, Kandersteg. Mr. J. M. Adye exhibited a long series of remarkable varieties of *Boarmia repandata*, including several var. *conversaria* taken last July in the New Forest. Mr. C. O. Waterhouse exhibited a photograph of the middle of the eye of a male *Tabanus*, showing square and other forms of facets, multiplied 25 times.—H. Goss, *Hon. Secretary*.

BIRMINGHAM ENTOMOLOGICAL SOCIETY.—On January 16th, 1893, a Lecture was delivered by Col. Charles Swinhoe, on "Protective Resemblance and Mimicry in Insects."—In the lecture, which was illustrated by photographic lantern slides, some of which were beautifully coloured, he gave a number of cases and facts of mimicry which were quite new, and very interesting.—COLBRAN J. WAINWRIGHT, *Hon. Sec.*

THE CAMBRIDGE ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—December 5th.—The Secretary exhibited on behalf of Dr. Sharp, F.R.S., a section cut from a branch of poplar, showing a mine of some larva. Dr. Sharp had found these mines very common in the willow and poplar trees in and round about Cambridge, and thought they would probably turn out to be the work of *Saporda charcarius*, a beetle, which although very rare in most parts of Britain, is common in Cambridge. Mr. Rickard exhibited some very large beetles of the order *Scarabæus*, and some spiders collected at Dalman, South Africa; also a number of specimens and their cocoons of an *Ichneumon*, bred from larvæ of *Abrazas grosulariata*. Mr. Farren, a series each of *Eupithecia extensaria* from Norfolk, and *Acidalia immorata* from Lewes. Mr. G. H. Bryan exhibited under the microscope:—*Xanthidiæ*, from chipping of flint; *Diatoma vulgaris*; *Meridion circulare*; Proboscis of blow-fly showing teeth; *Gamasus*—Parasite of *Haltica*; and Algæ—*Draparnaldia plumosa*." W. FARREN, *Hon. Sec.*

REVIEWS.

THE TRANSACTIONS OF THE CITY OF LONDON ENTOMOLOGICAL SOCIETY, 1892. Published at the Society's rooms, London Institution, Finsbury Square, E.C. Price, 2s.—This active Society of working entomologists has produced its *Transactions* again well up to date, and entomologists will find numerous notes, hints, and papers to interest them. The papers read before the Society by Messrs. Robson, Bayne, Lewcock, Battley, Clark, Quail, Tutt and Dr. Buckell, are printed *in extenso*, and those who wish the Society well, and can aid it financially, would do well to purchase its *Transactions* each year from the Secretary. The low subscriptions to this Society, in order to make it as available as possible to all, does not enable its Council to do ambitious work, but what it does it does well.

THE PROCEEDINGS OF THE SOUTH LONDON ENTOMOLOGICAL SOCIETY, 1890-1891. Published at the Society's Rooms, Hibernia Chambers, London Bridge, S.E. Price, 3s. 6d.—"Better late than never" is a phrase that may generally be well applied to the *Transactions* issued by this Society. There is one doubtful benefit in being two years behind time: one feels constrained to read what would otherwise be put on the book-shelves for future reference, and old ideas and discussions re-awaken into vigorous life, and remind one of the rapid course and

onward flow of science. The present volume, however, deserves more than usual notice from lepidopterists outside the Society, owing to the papers by Messrs. Adkin and Cockerell (pp. 62-84), and a further paper by Mr. Adkin (pp. 150-168), as well as one by Mr. Billups and another by Mr. Carrington. For these papers alone, the *Proceedings* are worth buying by all entomologists, who will find them interesting and well worth reading. There are a more than usually large number of printer's errors. Our friend Mr. Ovenden of Strood, figures as "Mr. Ovington," on p. 144; *Peronea* more than once becomes "*Pero-nia*"; and *Retinia* becomes "*Retinea*," and so on. We only mention these, as such errors are usually very rare in The Proceedings of this Society.

DIE PALEARKTISCHEN GROSS-SCHMETTERLINGE UND IHRE NATURGESCHICHTE, Bearbeitet von Fritz Rühl. Published by Ernst Heyne, Leipzig. First Part (Nos. 1 and 2), 2s. 6d.—The double number before us contains an introduction of 76 pp., and descriptions of the species in the early genera of the *Papilionidæ*, and their varieties. Slowly, but surely, entomology as a science is extending itself: the ordinary books on the subject are leaving the old beaten tracks in which the systematic work of other days was done, and the describers of both insects and larvæ generally add some observations to the bare bones of description which sufficed not long since for the purely scientific aspect of our work. Much more slowly than in botany, perhaps because workers are fewer, and that the preliminary systematic work has yet been less thoroughly done, but just as certainly, the scientific aspect of our subject, rather than the systematic, is growing uppermost in our minds, and we want to know not only what is, but what are the probable causes which have made entomological facts what they are. Scattered over the entomological literature of the Continent, are endless descriptions of local forms, varieties and aberrations of lepidoptera, and to inform entomologists of these, as well as to give some general hints to collectors, is the stated object of the present work. If this were done, it would be a good work, but the method adopted is likely to lead to very different results. As the first book of its kind attempted in Germany, it should receive a hearty welcome, and it is, perhaps, not well to look for everything at once, or criticise its method. The writer, however, appears to us to have fallen into one great error. Instead of quoting original descriptions and notes, he re-describes from specimens, wrongly called "types," which have been sent from various collectors and dealers. This must necessarily lead into gross error, not so much among the well-defined Macro-Lepidoptera, as among the species of *Argynnis*, *Lycæna*, and endless genera of GEOMETRÆ and NOCTUÆ. Of course, we know that reference to original descriptions and types entails hard work, but all useful scientific work presents difficulties, and this rough-and-ready method of work is hardly scientific. To describe specimens sent from a dealer, as "types" of certain varieties, is a farce; we have five specimens sent from one of the best-known Continental dealers, as types of *Agrotis tritici* var. *aquilina*; these represent, not only five different forms, but three distinct species. As the author is getting some of his "types" from the same source, his book will not be altogether reliable. We hope it is not yet too late for him to consider this. The *Introduction* is interesting and useful, giving full notes and hints on capturing and setting insects, larvæ rearing and preserving, etc. We wish we could criticise the method of the book as satisfactorily as the obvious intentions of the author.—ED.

The Entomologist's Record AND JOURNAL OF VARIATION.

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THE GENUS *XANTHIA*:

WITH NOTES ON VARIATION, HABITS AND AFFINITIES.

By J. W. TUTT, F.E.S.

(Continued from page 28.)

Xanthia citrigo.—This species appears to have nothing in common with *flavago* and *fulvago*, which I look upon as the true types of the genus *Xanthia*. I have previously mentioned the strange fact that the terminal segment of the pupa in no way resembles either of the groups with which it is usually allied, that is, with those *Orthosidæ* like *Glæa*, or, on the other hand, with those *Orthosidæ* which come near the *Hadenidæ* like *Teniocampa*; in fact, Dr. Chapman calls my attention to its similarity in this respect to *Cuspidia* (*Acronycta*), although I do not mean to suggest that it has any close affinity with *Acronycta* from this isolated fact. At the same time there is no doubt from its general characters, habit of the larva, pupal structure, different arrangement of transverse lines, etc., in the imago, that the moth has no very great affinities with those species with which it is at present grouped.

Xanthia citrigo is distinctly of two shades of colour—a pale orange, almost yellow, and a rich orange approaching the colour of *croceago*, in fact, one specimen kindly given to me by Mr. Holland quite equals that species in intensity. This coloration is to a certain extent sexual, for whilst a large number of the males and all the females are of the paler tint, a small proportion of the males are of the darker orange coloration; not that there is any very distinct line of demarcation, but the males are certainly dimorphic, or, at least, have a strong dimorphic tendency, the females (at least, not in the large number of specimens I have) certainly not exhibiting this difference in anything like so marked a degree, or, in fact, at all. This dimorphic tendency in the males is accentuated by the development in most of the richer coloured specimens of a distinct, well-marked, dark fascia crossing the centre of the wing between the stigmata, the fasciated appearance being due to the widening of the normally fine central line by a shading of fuscous scales on its outer edge and its union with the reniform, which in these specimens also partakes of a fuscous hue. All my extreme, strongly-marked specimens are, without exception, males. One specimen I have before referred to is very striking, not only from the richness of the ground colour, but from the fact that outwards from the elbowed line it is so suffused with dark scales as to have the appearance of an outer band, as is so common in *X. aurago*. This, perhaps, shows simply

a tendency to produce a common form of variation for purposes of protection, as this specimen of *citrago* came from Reading where the banded form of *aurago* is very abundant. The pale yellow form of this species is the type, the richer coloured orange form being known as var. *aurantiago*, whilst that in which the central line becomes fasciated is the *subflava* of Eversmann recorded by Staudinger from "Ural and Petropolis." The imago hides away in the day among the leaves and herbage beneath or near the lime trees, flies at night about the trees, and is best taken by sugaring the twigs of the trees. This species does not hibernate. It lays its eggs in the autumn, on the buds of the lime, and these hatch with the bursting of the buds in spring. They live at first in the buds, but the young larvæ soon leave these (in early May) and may then be found between two flat leaves of lime, which have been fastened by silk, or otherwise the leaf is doubled over in part on itself. By standing under the trees so as to get the leaves between the eye and the sky, the young larvæ may be readily detected. They come out to feed at night and can then be beaten. Mr. Fenn says that they do not always hide between leaves, but go into crevices of bark, etc. This is now supposed to be a difference of habit due to a difference of age, the wandering habit increasing as the larvæ get full-fed. The larva forms its cocoon in the first week of June, but does not pupate for nearly two months after doing so, the moth appearing in September or October. Captain Robertson states that Mr. Holland found a larva of this species feeding on "nut" (*Ent. Rec.*, i., p. 342).

Citrago appears to occur in almost all our English counties, and is so abundant in some Yorkshire localities, that one is astonished not to find records from Scotland. It occurs in Ireland, being recorded from county Wicklow. I have, however, never seen Irish specimens and cannot say if they differ from those obtained in England. Staudinger gives as the range of the species:—"Central and Northern Europe (except Polar Region); Pyrenees; Piedmont; S. and E. Russia."

Xanthia aurago.—Although this species is certainly not so closely allied to *flavago*, *fulvago* and *gilvago* as they are to each other, yet it is much more closely allied to them than to either of the species we have already considered. The different arrangement of the darker colour in the formation of bands gives a very different general appearance to this species, but the arrangement of the transverse lines, etc., closely approximates, and so it does in other particulars. Very few of us had any idea of the beautiful forms this species was capable of producing until Mrs. Bazett, Mr. Holland and other Reading lepidopterists supplied us freely with the species. It is a very variable species, much more so than any other of its congeners, the only other really variable *Xanthia* being *fulvago*. The palest form of the ground colour of this species is a clear primrose yellow, in some rather inclining to white. From this it passes through pale orange to a rich orange tint, richer and redder than the tint of *croceago*. I once saw one of the pale yellow specimens with scarcely the faintest trace of a dark mark. This was taken by Mr. Chittenden near Ashford in Kent, and I believe that no specimen of this form has ever been captured among the hundreds taken by the Reading collectors. Generally speaking, the ground colour is confined to the central area, the basal space and the outer area (beyond the elbowed line) being of a darker hue. This darker colour is generally red, but occasionally deep purple, the bands of either colour contrasting strongly when the ground colour is pale yellow, but the

effect of the red becomes partially lost when the ground colour is of a rich orange tint. This is sometimes so far intensified that the whole wing area becomes unicolorous orange red, occasionally even unicolorous purple red. The type is the form with the central area pale yellow, and the basal and outer areas reddish-purple; the corresponding form, with the central area pale orange, is called *virgata*, whilst that with the central area of a rich orange red is the *rutilago* of Fabricius. The unicolorous pale yellow form is known as *lutea*, whilst the unicolorous rich purplish red form is the *fucata* of Esper. One other beautiful form has the orange central area very much mottled. Mr. Holland says of this species:—"An occasional imago falls to the beating-stick, but the great majority seem to be hidden in the herbage and leaves below. At dark they will be found to have come to the top of the grasses and other plants, or feeding on the blackberries, but, like *fulvago* and *flavago*, they take wing at once on some evenings. Sugared twigs, however, will generally stop them. Books say the larvæ hide in the chinks of the bark; I have never been able to find them, and I must say for larvæ having that habit they are most unfortunate in feeding on a tree the bark of which is as smooth as a telegraph pole."

I know nothing of the egg-laying of this species, but Newman states that the larva feeds on "birch (*Fagus sylvatica*)" an evident printer's error for "beech." The egg is, according to the Rev. J. Hellins (*Ent. Mo. Mag.*, vi., p. 222), laid in September, and hatches in March or April. He further states that, unlike many that hibernate in the ova state, but in which the larva is fully developed in the autumn, the egg of *aurago* has been examined from time to time up to the middle of January, without anything but the faintest traces of the future larvæ having been detected by microscopic examination of their still fluid contents, but that at the last examination—about January 14th—the larva of *X. aurago* was found partially developed, but not to such a degree that it could be extracted from the shell in the larval form. Mr. Machin records finding a larva on *Spiræa filipendula*, from which he bred a fine dark imago. (At the meeting, Mr. Bloomfield recorded the capture of two larvæ on maple in Suffolk. These he bred).

Aurago is very local in Britain, Kent (neighbourhood of Wye and Ashford) and near Reading being its head quarters. It is also recorded from Llangollen, and Mr. Birchall recorded it as taken in Ireland by Mr. Haughton, although the locality was unknown. It has not been recorded from Scotland or the northern counties of England, so that its range is comparatively restricted. Staudinger gives as its range on the Continent:—"Central Europe (except Livonia); S. Sweden; Denmark; Piedmont; Etruria; Corsica."

(To be continued.)

SCIENTIFIC NOTES.

CRITICAL NOTES ON CERTAIN NOCTUÆ (Plate C, figs. 1, 2 and 3.—The large amount of reference to scientific works into which my recently finished work on *The British Noctuæ and their Varieties* has led me, has brought to my notice some very strange facts connected with certain species. The following notes, although embodied in that work, are sure to prove of such general interest, that I have no hesitation in bringing them under the notice of our readers.

In the *Ent. Mo. Mag.*, vol. xxv., pp. 52—55, I discussed at length the position of *Tapinostola concolor*, and with a view rather of obtaining more information or starting a discussion on the subject, and on the strength of some strange specimens of *T. fulva*, which I took in July, I proposed dropping *concolor* as a var. of *fulva*. In this I was undoubtedly wrong. At the same time I carefully examined Hübner's figure of *extrema* and came to the conclusion that it was our *bondii*. I am still of that opinion. Others, however, differ from me. Dr. Knaggs thought this figure to be *bondii*, Zeller that it was not, Doubleday, Herrich-Schäffer, Lederer and Treitschke have all given uncertain opinions without definite conclusions; Ochsenheimer made Hübner's *extrema* the ♀ of *fulva*. Staudinger had settled in his own mind that Guenée's newly-described *concolor* agreed with Hübner's *extrema*, but after having seen the original specimen from which Hübner's figure was made, he writes not that it is *concolor*, but that "it comes nearest to a whitish female *concolor*, Gn. but certainly with blackish cilia." In the face of all this doubt, I have, in *The British Noctux*, vol. iv., p. 99, withdrawn the position I assigned it in vol. i., p. 47, and I have also suggested that the name *extrema* should be allowed to drop altogether as being so doubtful. I believe that our species so far should stand as follows:—

Tapinostola concolor, Gn.

extrema, Hb. ?

Tapinostola fulva, Hb. (red form).

var. *concolor*, Tutt (white form), *E.M.M.*, vol. xxv., so much as refers to whitish specimens from Deal.

Reference to Plate C presented with the February number of *The Ent. Record* will make the distinction of these species clear. Fig. 2 is *T. fulva* var. *concolor*, Tutt, agreeing with the form described by me from Deal, although the transverse series of spots so conspicuous in Fig. 3 (*concolor*) is absent in this particular specimen of *fulva*. I did not notice this when the specimen was selected, but the dots are frequently almost as distinct as in fig. 3. Fig. 3 represents the true *concolor*, a rather larger and broader-winged species than *fulva*, although much like the pale var. of the latter in colour, as a comparison of the figures shows. The shading along the median nervure is, perhaps, generally rather more pronounced in *fulva*, and the transverse series of dots, a very constant feature in *concolor*, is very variable both in intensity and development in *fulva*.

Fig. 1 represents *Acosmetia morrisii*, Dale, a species we have known for some time as *bondii*, Knaggs. It has always appeared wonderful to me that a species turned up at Folkestone as late as 1861, should then have required a new name; and this remarkable circumstance I have repeatedly communicated to entomological friends. I was set on the move about this species first, by a note which Mr. Dale wrote to *The Ent. Record*, vol. i., p. 34, in which he refers *morrisii* to *arcuosa* as a pale var. I wanted to know more about *morrisii* for my book on *The British Noctux*, but for some time I could not find anything. However, one day looking through the last plates of the *Noctux* in Humphrey and Westwood's *British Moths*, I came across a figure, at the sight of which I ejaculated, "*extrema*, Hb.—*bondii*, Knaggs." I turned to the letterpress and the name was *morrisii*. I immediately went to my cabinet, satisfied myself as to its identity with *bondii* at once, both from the figure and letterpress (the hind wings of the figure are unmistakable) and then set to work to learn more. The specimen from which this figure was made was captured by Mr. Morris himself at Charmouth, in the

same line of coast, and about ten miles from the well known locality for *bondii* at Lyme Regis, discovered by Mr. Wormald, and afterwards captured there in plenty by Messrs. Goss and Tugwell. The greatest puzzle about the whole affair, is to think that a species described by Mr. Dale, in *The Naturalist*, vol. ii., p. 88, and Errata, figured by Humphrey and Westwood, in 1843 or 1844, under Dale's name, should be re-described in 1861 (18 years at the most) and accepted by entomologists without question. Perhaps they lived more slowly in those days; at any rate, they appear to have lived with their eyes partly shut. I am not particularly surprised that Dr. Knaggs re-described the species. The few years that he was devoted to the study of Lepidoptera brought many new things to light, which have since sunk in darkness; but I am astonished that men, of comparatively good scientific knowledge, with Humphrey and Westwood always in their hands as their every-day reference book, did not detect the blunder committed by a (may I say?) then comparative beginner. Perhaps it was then as it is now. If work be not done in the groove laid down by our extra-scientific friends, it is something to be ignored and jumped on. This, it appears to have been taken for granted, was bound to be correct, and did not want enquiring into. Fancy the lepidopterists of to-day letting some comparative beginner re-describe a species only 18 years old; and yet, this is what the entomologists of 1861 did. *Bondii*, Knaggs, will therefore have in future to be labelled *morrisii*, Dale.—J. W. TUTT. February 28th, 1893.

NEW CLASSIFICATION OF THE LEPIDOPTERA-HETEROCERA, AS PROPOSED
BY DR. CHAPMAN.

A.—OBTECTÆ.—Pupa smooth and rounded, externally solid, inner dissepiments flimsy. Free segments in both sexes 5th and 6th (abl.). Never emerges from cocoon, or progresses in any way. Dehiscence by irregular fracture.

- 1.—MACROS.—Larva with hooks of ventral prolegs on inner side only (Exposed feeders). *Sphinges*, *Bombyces*, *Nolidae*, *Nycteolidæ*, *Noctuidæ*, *Geometræ*.
- 2.—PYRALOIDS.—Larva with complete circle of hooks to ventral prolegs (Concealed feeders). *Pyræles*, *Phycidæ*, *Eudoridæ*, *Crambidæ*, *Gelechiidæ*, *Plutellidæ*, *Ecophoridæ*. (*Epigrahiidæ*, *Alucitidæ*).
- 3.—————?—Doubtful whether Pyraloids or of separate (classificatory) value. *Hyponomeutidæ*, *Argyresthidæ*, *Coleophoridæ*. (*Perittia*?) (*Elachistidæ*?).

B.—INCOMPLETEÆ.—Pupa less solid and rounded, appendages often partially free. Free segments may extend upwards to 3rd (abdominal). 7th always free in male, fixed in female. Dehiscence accompanied by freeing of segments and appendages previously fixed. (Except in 1) pupa progresses and emerges from cocoon.

- 1.—Pupa attached by cremaster. Free segments. 4 5 6 7. 4 5 6. *Pterophorina*.
- 2.—Pupa free to move and emerge from cocoon.
 - a.—Larva concealed feeder, often miner and usually rather active when not cramped by mine.

- B.—(cont.)—1.—Free segments. 5 6 7. 5 6. *Lithocolletidæ*, *Gracilaridæ*.
- 2.—Free segments. 4 5 6 7. 4 5 6.
 a.—TINEÆ (*Tineidæ*, *Psychidæ*, *Sesiidæ*).
 b.—TORTRICES (*Tortricina*, *Cossus*, *Exapate*, *Simathis*). (*Castnia*).
- 3.—Free segments. 3 4 5 6 7. 3 4 5 6.
 a.—ZEUZERA and HEPIALUS, tend to lose 3rd as a free segment.
 b.—TISCHERIA.
 c.—ADELIDÆ. Ovipositor (of imago) formed for piercing plant tissues (includes *Erioccephalæ*).
 d.—NEPTICULIDÆ. Antennæ separate from head in dehiscence.
- b.—Larva exposed feeder. Sluglike in form and movements, head very retractile. Free segments. 3 4 5 6 7. 3 4 5 6.
- 1.—MICROPTERYGIDÆ. Eight pairs abdominal legs, curious appendages, moss feeders.
- 2.—COCHLIPODIDÆ. Legs evanescent, but traces of extra pairs and of curious appendages. Max. palps large in pupa, not in imago:
- 3.—ZYGÆNIDÆ. Legs of macro type. Max. palps evanescent in pupa.
- C.———?—Pupa with no free segments, appendages adherent to all abdominal segments. *Lyonetia*, *Cemiosstoma*, *Bedellia*.

ACIDALIA HUMILIATA, HUFN. (Plate C, fig. 19).—With regard to my note on this species in the last number of this Magazine, our readers will have noticed that I carefully refrained from giving a decided opinion relative to the specimen as figured on Plate C, fig. 19. In *The Entomologist*, vol. xxii., pp. 121-125, I discussed at length our species usually known as *dilutaria* or *interjectaria*. There is no need to traverse all the ground again, but I dealt with all the descriptions and records of British specimens up to date, and came to the conclusion that all our British specimens belonged to one and the same species, and that *osseata*, Hb., as some of our red-costa specimens were called, was only a form of this species. I referred to Hübner's original figure, and this fully bore out my conclusion, Hübner's *osseata* was undoubtedly our common *interjectaria*, and not a distinct species. I have referred to it again, and I am more strongly than ever of the same opinion. But an allied species has long been sent out by Continental entomologists as *humiliata*, Hufn. This used to be most carefully referred to by certain professional entomologists as "the true *osseata*," and of these specimens Mr. C. G. Barrett very pointedly writes in the current number of the *Ent. Mo. Mag.*:—"Then came a time when it was important from a financial point of view that British *osseata* should be obtained, and, accordingly, specimens differing in no respect from those found upon the Continent—having more pointed wings, strigæ more oblique, and the costa of quite a different red, were readily obtainable by those who were willing to pay a good price, and, for a time, these were believed to be genuine natives. Cause for doubt, however, arose, and in 1872 Mr. Doubleday wrote to me as follows:—*I do not believe that the beautiful specimens of the true osseata which*

... brought here, and said were captured by ... were British. I looked at them with a lens, and believe that they had all been re-set.' And later, he wrote that they were 'gross impostures.' This opinion became general, and the name *osseata* disappeared from our cabinets and lists" (*Ent. Mo. Mag.*, vol. xxix., p. 66). At this time, then, we had—just after the time of the introduction of these foreign examples—reached a point, where the species known (though only to British lepidopterists) as "the true *osseata*," was not recognised as a British species, and from this standpoint of information I wrote my note in *The Entomologist*, and showed that *osseata*, Hb. was a species not distinct from ours; and that, if the Continental *humiliata*, Hufn. was the same as *osseata*, Hb., as per Staudinger and Wocke's *Catalog*, then we had only one species in Britain, viz., *humiliata*, Hufn., (= *osseata*, Hb. = *interjectaria*, Bdv. = *dilutaria*, Hb.?). Here I left it, and my contention being based on actual facts from the various authors' writings and figures is unanswerable. Mr. Hodges has now turned up a species, which Mr. Barrett says is the true *osseata*, Hb., and he heads a communication to the *Ent. Mo. Mag.*:—"The recent occurrence of the true *Acidalia osseata*, Hb., in Britain." Mr. Barrett cannot have looked up the literary matter in the works of Hufnagel, Hübner, Guenée, etc., or he would not go on perpetuating such a palpable blunder. *Osseata*, Hb. is undoubtedly the red-costa form of our common *interjectaria*. It has broad ample wings, characteristic *interjectaria* lines, and fails in every distinguishable point that Mr. Barrett lays stress on in his note, "the more pointed wings, strigæ more oblique," being, in fact, not only not present, but intensified in the opposite direction in Hübner's figure, "the apex being particularly rounded, the outer margin particularly square, and the strigæ particularly straight." The only common feature is the red costa. Staudinger I know, makes *osseata*, Hb., a synonym of *humiliata*, but that is undoubtedly an error (and a very allowable one) due to Staudinger's evident ignorance of our common *interjectaria* sometimes having such a mode of variation. There really appears to be a second species on the Continent, and *humiliata* appears to be the name by which this narrow-winged species is known there, but I am not sure that the new British species which Mr. Hodges undoubtedly introduces for the first time is the same as this, as all the German *humiliata* I have received have been our common *interjectaria*. But, accepting Mr. Barrett's dictum that the real *humiliata* of Continental collections is what he calls *osseata* where is the necessity for perpetuating a gross blunder in referring to it a name that belongs to another species. Is it because we are such scientists as to take the German dealers' types in faith, and are more or less incapable of working out original matter from authors for ourselves? The energetic way we refer to specimens from Continental dealers without ever testing their conclusions, and then base our arguments on their most profound ignorance, is beyond my comprehension. If we are to do science, let us go to the fountain head, and not perpetuate Continental errors by comparison with so-called German "types." Mr. Barrett makes another very unsatisfactory remark, considering the certainty expressed in the title of his note. He says: "In all these respects, they (Mr. Hodges' specimens) agree accurately with Continental specimens of *osseata* (so-called, as they are sent as *humiliata*, unless we send for specimens in the synonymic name—J.W.T.), but are not more than from one-half to two-thirds the size of

the latter." Mr. Barrett further supposes this small size may be due to the probability that "at the extreme south of these Islands the species has reached the extreme limit of its range, and maintains itself with difficulty." Why, even a reference to Staudinger's *Catalog* would have informed Mr. Barrett that the species sent by the Continental collectors as *humiliata* (the true *osseata*, Hb. as it is called by Mr. Barrett) occurs in the "whole of Europe (except that part N. of the 60° parallel of latitude, Sicily, Sardinia, Corsica and Greece)," so that the South of England is some 630 miles within this limit; and its small size, if it really be the same species, must be referred to another cause. I will not say that Mr. Hodges' specimens are not *humiliata*, because my ignorance of this is perfect at present. I do maintain most strongly that they are not *osseata*, Hübn.

The two species we have (or soon hope to have) in our cabinets, should at present be labelled as follows:—

1.—*humiliata*, Hufn., Stdgr.

2.—*osseata*, Hb. 102 (form with reddish costa).

var. *interjectaria*, Bdv. (form without reddish costa).

It may be considered that this is rather a violent tirade on a small matter, but it is almost time that those who teach us should do so on a scientific basis, and not with unsatisfactory German types, about which our teachers know little, and appear to take no trouble to learn more. —J. W. TUTT, February 28th, 1893.

CURRENT NOTES.

A most interesting paper on hybridising Burnet Moths (*Zygæna*) by Mr. W. H. B. Fletcher, is to be found in the current No. of the *Ent. Mo. Mag.* We hope to refer to this later on.

A new Coccid taken by Mr. E. R. Banks, on July 12th, last, at Corfe Castle, on the undersides of twigs of *Thesium humifusum*, is described and named *Pollinia thesii*, by Mr. J. W. Douglas.

The Rev. Theodore Wood records the capture of a single specimen of *Aporia crataegi* in East Kent, on the 28th of June last. So many pupæ have been put down of late years to try to re-introduce the species, that it is not advisable to lay too much stress on the occurrence of occasional specimens. We still look forward to its reappearance however, in its old abundance, without artificial aid.

We notice in the *Proceedings of the Folkestone Natural History Society*, 1892, a report of the principal lepidoptera captured in the district during 1892. *Ophiodes lunaris* by Mr. Austin; *Cloantha perspicillaris* by Lieut. Brown; three *Deiopeia pulchella* in May, and one in August; *Plusia moneta*, *Leucania albipuncta*, *Sphinx convolvuli* and *Ennomos autumnaria* were also captured. Most interesting is the note that Mr. Austin has turned up *Nola centonalis* at Folkestone. We do not object to philanthropy, but when philanthropists found out the Deal sand-hills, and planted tents for about a hundred boys every summer, on one of the best collecting grounds in the kingdom, converted it into a playground, and generally destroyed the district entomologically, our sympathies were certainly not with the philanthropist. As *Nola centonalis* has through these reasons become unobtainable at Deal, its occurrence at Folkestone is particularly satisfactory, especially as it has fallen into the hands of a collector who knows well how to work it.

Dr. Knaggs, who was on the editorial staff of the *Ent. Mo. Mag.* at its commencement, but who retired from entomological pursuits some 25 years ago, has just come before the public again, and takes up the cudgels on behalf of *Clostera anachoreta*. His note, in which he seeks to restore the shaken position of this species as British, is rather smartly handled by the Rev. J. Greene, and as he referred in his note to specimens taken at Deal, Mr. Webb very reasonably enquires, whether the species was not "laid down" in many outlying localities around that part of the Kent coast, either by Dr. Knaggs himself, or others. Very little doubt exists in the minds of lepidopterists nowadays, that this species was in some unexplained (as yet) manner, introduced with the poplars at Folkestone, on which they were found. Its enormous egg-laying power makes it impossible that such a species as this should die out if a regular native, and yet, this is what it has done; as no district in England is more regularly or closely worked than the Folkestone home of this species.

It has been known ever since the discovery of the species in abundance in Scotland, that *Retinia resinella* took two years to come to maturity. Strange to say, a general impression has got about that it only occurs once in two years, *i.e.*, that the imagines do not appear every year. At a recent meeting of the South London Ent. Soc., Mr. McArthur referred to this *Retinia*, and we asked him whether there was any foundation for this latter supposition. He stated that it only occurred once in two years according to his experience. It was then suggested that it must have been a recent importation to have such a regular and strange mode of appearance. Mr. Adkin, in a contemporary, asks for information from Continental lepidopterists on this point. Perhaps, some of our Scotch friends can tell us whether *R. resinana* is so absolutely biennial as we are learning to consider it.

We should be interested to learn what, in the days gone by, the City of London Entom. Soc. did to earn the dislike of the Editor of one of our contemporaries. The reason for his dislike of ourselves is well-known and obvious, but we are, as yet, a little in the dark as to the cause of the City of London's iniquity. The following geographical item from *The Entomologist* is interesting, "*fuliginosa* (Isle of Manfarnis)" this means, we presume, "*fuliginosa* (Isle of Man forms)," or where is the Isle of Manfarnis?

A photograph of the highly esteemed President of the City of London Ent. Society (Mr. J. A. Clark), is given with the current No. of *The British Naturalist*.

We suppose that all British lepidopterists thought they knew the correct names of the species *Colias hyale* and *edusa*, and since the lepidopterists of all other parts of the world agreed with us, we might have considered ourselves pretty safe. However, Mr. C. W. Dale has just attempted to show that our *edusa* is really *hyale*, and that *hyale* has no name at all. He then suggests that we might call *hyale—edusa*, a bouleversement that may find various names among synonymists in general. We should advise Mr. Dale to be governed by his last suggestion and leave the names alone, as the ancient history which he quotes is quite arguable, and open to differences of opinion. If it were quite modern the case would be different.

PRACTICAL HINTS.

THE MONTH.—On mild evenings during this month, many of the hibernated larvæ will wake up from their winter sleep, and as some were nearly, if not quite, full-fed before hibernation, seem now only to seek a suitable place for pupation. Among these may be mentioned, *Apamea unanimitis*, *A. basilinea*, *Bombyx rubi*, &c.

Many smaller (hibernated) larvæ will be seen eagerly devouring the young willow and bramble leaves, but these had better be left in their wild state until next month, and the energies of the collector devoted to the tempting willow bloom, which, in favourable weather, ought to be throwing out its "sweets," to which insects throng in great profusion, more especially the *Tæniocampa*, all of which have been captured at this natural bait; the luscious meal seems to intoxicate insect life, thereby rendering capture easy. They may be either boxed singly off the bloom, or an umbrella may be held under the bush and the insects shaken into it; probably the latter method would be the better, as some might be overlooked.

Many freshly emerged species appear this month, specially the rare *Endromis versicolor* in birch woods. *Petasia nubeculosa*, entirely Scotch and very local. *Notodonta carmelita* is said to fly in the sunshine, and to be attracted by puddles; has also been taken at willow. *Nyssia hispidaria*, on oak trunks, ♀ wingless, Richmond Park is a well-known locality, also Epping Forest. Insects enumerated in February list still to be searched for.—J. P. Mutch.

EARLY SPRING EMERGENCES.—*Nyssia hispidaria* and *Tephrosia crepuscularia* were out in numbers very early this year. I heard of both by the 18th of February. It is to be trusted that specimens of the latter will be obtained from localities not usually worked so early. Both species will probably continue until the end of March.—J. W. Tutt.

BOMBYX RUBI.—As I have bred a great number of *Bombyx rubi*, it may be of interest to some of the readers of the *Ent. Record* to know how the larvæ are managed. They are collected in the first or second week of October, and placed in a large empty wine case, which is about 30 inches long, 14 inches broad, 20 inches high at the back, and 15 inches high in front; the size of the space in the back of the box for ventilation is 15 by 5 inches, covered with perforated zinc; the case covered with a close fitting glazed frame and made secure with hooks. The case is placed out of doors. In the inside, at each end of the case, a layer, about 6 inches deep, of *Sphagnum* moss is placed for the larvæ to hibernate in; no moss is put into the centre of the box where the jelly jar stands, which contains the food plant for the larva. So soon as the larvæ are full-fed, they hibernate, rolled up in a close ring. When the warm weather returns in spring, the larvæ come from their place of hibernation and spin up, generally on the top of the *Sphagnum* moss. I have taken the virgin females to the moors in a box covered with strong gauze, where I knew the larvæ had been plentiful, and it is astonishing the number of males that were attracted. In one evening I have brought home over 80 male specimens attracted by the virgin females; in fact, they came so fast that I had no time to pin or box; I gave the thorax of the good specimens a pinch with my finger and thumb below the fore wings, and laid them down. The

time of flight of *B. rubi* is between 6.15 and 7.45 p.m. in this locality.—J. FINLAY, Meldon Park, Morpeth.

ENDROMIS VERSICOLOR.—For some years I have annually bred a fair number of this species and have got almost every larva into the pupal stage, but my percentage of imagines has been fearfully small. Last autumn, I found about the ordinary number of pupæ in my sleeves, which I carried, as usual, into a cold greenhouse. Instead, however, of awaiting their emergence as usual, I brought the cocoons into the kitchen on February 26th, placed them in a large flower pot, and stood them on the kitchen mantel-piece. The same evening three males emerged; the next day three more. On February 28th, three males and one female; whilst yesterday, March 1st, three males and a second female appeared. All emerged during my absence from home, some time between 8 a.m. and 5 p.m. I found both the females *in cop.* on my return, and they have both begun to lay well. Some branches of birch in a box with cracks in it appear to be an advantage, as I find most of the eggs laid either on the branches of the birch, where they are very conspicuous, or between two layers of cardboard, round which the female thrusts her ovipositor, and where the ova are very inconspicuous. How do they lay in nature? Behind the loose pieces of birch bark which are so frequent, I should presume.—J. W. TUTT. *March 2nd, 1893.*

OBTAINING OVA.—*Pachnotia leucographa* and *Hoplorina croceago* will lay freely; the former if put in a roomy glass cylinder with plantain leaves, and the latter on dead oak twigs and leaves.—ID.

FOOD PLANTS OF LARVÆ.—Larvæ of *Noctua plecta* pupated in December, the imagines coming out in a warm room early last month. Last year I fed *Odontopera bidentata* on *Ribes rubrum*; *Epione advenaria* on *Prunus*; *Macaria liturata* on *Pinus sylvestris*; *Triphæna fimbria* and *Noctua festiva* on *Rumex*; *Cerastis spadicea* on *Quercus robur*; *Aplecta prasina* on *Stellaria media*; *Bombyx quercus* on *Cytisus scoparius*; *Cidaria truncata* on *Rubus fruticosus*; *Hylophila prasinana* on *Pyrus malus*; *Hemerophila abruptaria* on *Fraxinus excelsior*, and an enormous brood of *Spilosoma menthastris* on *Salix caprea*.—A. NESBITT. *March 2nd, 1893.*

NOTES ON COLLECTING, Etc.

DOUBLE-BROODEDNESS OF SPILOSOMA FULIGINOSA.—In May, 1889, I obtained a few ova of *S. fuliginosa*, which hatched the same month and fed up very quickly on dock, all pupating about the end of June and beginning of July. Every one of these emerged during the latter month, and very large and bright specimens they are.—A. H. HAMM, Granby Gardens, Reading.

SPILOSOMA FULIGINOSA AND CLOSTERA RECLUSA SINGLE-BROODED AT MORPETH.—*Spilosoma fuliginosa* and *Clostera reclusa* are both single-brooded in this locality. The larvæ of *S. fuliginosa* I collect in September, and they hibernate full-fed and spin up in the spring. I put them into the same box with *B. rubi*. The imago emerges in May or June the following year. The larvæ of *Clostera reclusa* I collect in August and September from dwarf willow; they are full-fed and turn to chrysalides at the end of September, or beginning of October. The imago emerges in May the following year.—J. FINLAY, Morpeth. *February 27th.*

EARLY SPRING NOTES.—The almost midsummer heat tempted me to

take a stroll in the woods to-day; the usual early species were well to the fore; *Hybernia leucophæaria* in plenty and very variable was noted, together with a sprinkling of *Anisopteryx æscularia* whilst *Phigalia pilosaria* and *Tortricodes hyemana* were common; an unexpected find was a specimen of *Asphalia flavicornis* on the trunk of an oak; I do not recollect having seen the occurrence of this species noted in February before; but I remember some years ago taking a specimen off the "Archbishop's palings" at West Wickham, March 2nd. *Brepheos parthenias* was worked for, but not seen; I fancy this species also occurs in February in favourable seasons, as I saw a specimen a few years back at Tilgate on the 1st of March. A novel feature to me was the behaviour of *H. leucophæaria*. I have always found it in a very lethargic state in the fences or the trunks; but, to-day—excited by the temperature—it was flying merrily and even wildly in the sun, occasionally settling on the strewn leaves and brambles.—W. G. SHELDON, Croydon. February 19th, 1893.

As I recorded last season, we get in Epping Forest dark and banded forms of *Hybernia leucophæaria*, but the dark form has only occurred occasionally with me. On February 20th this year, over the same ground as in former years, I took more of the dark, than the type or any other form. As melanism is now occupying attention, it may be of interest if other collectors will record whether the same has been noticed by them around our district. *Phigalia pedaria*, *Hybernia marginaria*, *rupicaprararia* and *Anisopteryx æscularia* occurred, and I heard of *Nyssia hispidaria* on the same date.—AMBROSE QUAIL, 15, Stamford Hill, N. —February 24th, 1893.

I noticed a male specimen of *Pieris rapæ* flying in the sunshine in our garden on the 19th February. It was flying vigorously when I saw it in the middle of the day, but probably as the warmth declined, and its flight became weaker, it fell a victim to a hungry bird. In all probability these early specimens result from pupæ which have spun up in greenhouses, or near chimneys. I was rather confirmed in this view by the discovery of a female *rapæ* in a greenhouse only a few days ago.—WM. EDWARD NICHOLSON, Lewes. February 28th, 1893.

MICRO LEPIDOPTERA IN THE NORTH OF SCOTLAND IN 1892.—From various reports it would appear that the idea has become general in the South that, in the season of 1892, Scotland was a veritable El-Dorado to the collector of Lepidoptera. No doubt many insects were abnormally abundant, and, when we were favoured with a gleam of sunshine, certain species swarmed in a way to astonish and bewilder the tyro; yet, upon closer inspection, it did not require much insight to notice that the more interesting species were conspicuous by their absence. As far as Micro Lepidoptera are concerned the season was as bad as could well be imagined. Fortunately, the "eternal drizzle" did occasionally dispel, and the sun break through the clouds. On such occasions I was often surprised when I came to kill my captures at the number of rare species I had taken, and, of course, was greatly elated at my success. The fir woods in sheltered situations paid well. Several of the species of *Retinia*, and other fir-frequenting *TORTRICES* were rather common; *Coccyx coniferana*, for instance, was more abundant than I ever saw it before, and a nice series of *Retinia duplana* was taken near Forres. During the season I visited and worked for a longer or shorter period in the neighbourhood of Rannoch, and Kirkmichael in Perthshire, a little to the east of Loch Laggan in Invernesshire, Forres

and Lhanbryde in Elginshire, the coast of Kincardineshire, and the central and western portions of Aberdeenshire. I also worked over the high mountains south of Braemar, on both sides of Glen Beig and Glen Shee, the mountains at the head of the beautiful and romantic Canlochan Glen, and the hills west and south of Loch Brothachan. Work on the mountains was much interrupted by the heavy mists and cold winds, but, in spite of these hindrances, I succeeded in "turning up" many good insects, and, it was surprising how quickly the Alpine species seemed to take advantage of every little chance they had. At one time the hill tops would be swarming with life, and again—when the sun dipped under a cloud—not a wing could be seen. I have no doubt, on these mountains, if one were given good weather, it would be an easy matter to capture rare and local Alpine species in hundreds every day, while, on the other hand, it would be possible to spend weeks on the same hills, and in the end have to come away with empty boxes. I will now give a list of the insects seen or captured. It would take up too much time and space to mention all; I have, therefore, only noticed the more interesting species.

The DELTOIDES were represented by *Hypena proboscidalis*, which was swarming on the banks of the river Findhorn, near Forres, at dusk. The PYRALIDES were more common than usual, and one or two were very abundant; perhaps as common a species as any, and one which I have not seen for years, was *Pyrallis farinalis*; it was found swarming in a meal mill near Pitcaple. *Scoparia cembrae* was rare; I found a few by beating firs. *S. ambigua* rose in dozens with every stroke of the beating stick; they also swarmed everywhere at dusk, and were a perfect nuisance. In July, *S. dubitalis* was found on the rocks along the Kincardine coast, south of Aberdeen. Mr. Horne has seen the variety *ingratella* in the same locality. As yet, I have failed to do this; all I have captured are ordinary typical specimens. I have to thank Dr. F. Buchanan White of Perth for putting me on the trail of *S. alpina*, and profiting by his kindness, have now succeeded in discovering it in a number of different localities. It seems to frequent the lichen-covered summits of the higher mountains, and I have never seen it as yet below 3,000 ft; it flies with a short jerky flight in the afternoon sunshine, and, on a windy day, they rise from among the herbage at one's feet, and go skimming right away for several dozen yards, when it is a matter of no little difficulty to keep them in sight. I nearly came by a fatal accident while working for this species, by falling over a precipice in a dense mist; fortunately, I escaped with nothing worse than a fright, and a lesson to be more careful in future. *S. alpina* occurs on nearly all the mountains between Glen Shee and Braemar. On a fine day, it is common enough to the west of the highest point on Creag Leacach, and on the summit of the Glas Maol. *Nomophila noctuella*, generally a very rare species with us, was not uncommon. I never saw so many in a single season before. *Pyrausta purpuralis* accompanied by *Herbula cespitalis* were flying merrily on the hill slopes near Braemar. *Scopula alpinalis* has been gradually growing scarcer year by year for some time; it frequents grassy places on the hills, and used to be very abundant. This year I took it sparingly on the Braemar and Rannoch hills; owing to the high winds they required to be stalked, and I cannot say I ever saw it on the wing without being first knocked up. *S. lutealis* and *Botys fuscalis* were abundant on railway banks and waste places, the larvae of the former feeding on *Centaurea nigra*. *Spilodes forficalis*

as usual was common in gardens, the larvæ feeding on cabbage. The North of Scotland is not rich in Pterophori; they were rather more abundant this year than usual. I have, I believe, at last succeeded in identifying the Plume which I found on ragwort, with *Platyptilia bertrami*,* having found them in some abundance on *Achillea millefolium*; probably this species does not confine itself exclusively to *Achillea*. I have not again found the larvæ on ragwort, so it does not appear to be common on that plant. One *P. gonodactyla* was captured on the railway near Pitcaple; larvæ were also found on *Tussilago farfara*. This is a very rare insect in Aberdeenshire, and does not occur frequently anywhere in the North. *Amblyptilia acanthodactyla* was common at Forres, and elsewhere, flying over the heath by day. I noticed them in more abundance than usual. *Mimæseopitilus bipunctidactyla* larvæ were not uncommon on *Scabiosa succisa*; the imagines were also noticed on a wet heath at dusk. The larvæ of *M. pterodactyla* were common everywhere on *Veronica chamaedrys*. While at Braemar last year, with Mr. Maddison of Durham, we discovered *Acipitilia tetradactyla* among *Thymus serpyllum* in Glen Sluggan near Braemar. This season I again managed to secure a few in another locality near Braemar. I have never heard of this species being found in Scotland before. The beautiful little *Alucita hexadactyla* was fluttering about everywhere on quiet evenings among *Lonicera periclymenum*. I do not think any of the Crambidae were particularly abundant. With the exception of *C. myellus* I have seen all the others in greater abundance in former years. *Crambus pratellus* was seen almost everywhere, flying at dusk, among grass. A very small and obscure variety was noticed on the hills near the Hotel at Glen Shee. *C. dumetellus* was scarcer than usual. I saw several near Braemar, and succeeded in picking up a fine series while working on Schiehallion near Rannoch; this species is generally considered a nocturnal insect. It may be nocturnal in its habits elsewhere, but in Scotland, it is generally abundant enough in ordinary years, flying in the sunshine. I have seen it flying in dozens on the Culbin Sands at Forres, on quiet warm days. I only secured two *C. ericellus*, they were both in bad condition, and were found on Carn a' Bhealaich at dusk. Several *C. furcatellus*—nearly all in poor condition—were taken; they occurred on the southern slopes of a hill a little to the east of Cairnwall; the locality appeared to be all that one could desire for the species, but the sun kept under the clouds, and this insect will only fly in the sunshine, on quiet warm days. It occurs on grassy slopes on several of the mountains near Braemar, and elsewhere, at about 3,500 feet elevation. *C. margaritellus* was taken abundantly on a moor to the south of Ben-na-chie, flying at sundown. I have at last succeeded in finding *C. myellus* in something like abundance; it is very local, and appears to be an exceedingly shy creature, and requires a tremendous amount of work to find it. It flies for about ten minutes on very quiet dark evenings, just as it is growing dark, and it is exceedingly difficult to see in the gloom. My brother has been much more successful in finding it than I have. His mode of operation is to search miles of heather and young fir trees. I have seen him catch thirteen in one day. My own catch never exceeded six. Ova are easily obtained by half-killing the ♀ with cyanide

* We are not at all satisfied that the specimens obtained on *Achillea* and *Senecio* are identical. They will have to be bred side by side and careful comparison made before the matter can be even approximately settled.—En.

of potassium. The ovum when newly laid is nearly white; after a few hours it becomes light straw colour. *C. perlellus* var. *warringtonellus* abounded on the Culbin Sands at Forres. *C. tristellus* and *culmellus* were abundant everywhere, the former flying at dusk, and the other by day. *C. hortuellus* was rather rare, or probably did not come under my notice. Several specimens of the genus *Phycis* were knocked out of the heather. One *Dioryctria abietella* was caught at Forres last year. I bred several from fir cones, old *resinana* exudations, and rotten branches; the imagines visit ragwort flowers at dusk. *Aphomia sociella* was flying about everywhere near Pitcaple at dusk. Several of the common TORTRICES were excessively abundant, and among others I noticed the following:— One *Sarrothripa revayana* at Pitcaple; this is a rare insect in the North, and as yet, I have only seen a very small number, and never more than one at a time. *Tortrix corylana* was flying in the Blackwood at Rannoch; it did not appear to be plentiful. *T. viburniana* occurs on all the hills and moors; it is always a common species, and the present season was no exception to the rule. *T. ministrana* was swarming in the Altyre Wood at Forres. My friend, Mr. Milne, happened to visit Forres with me, while this species was on the wing, and one night, we worked for about an hour in one of the rides, trying to get a few of the dark variety, but in spite of all our exertions, and the fact that the insects were flying in clouds, we did not find anything of importance. *Peronea mixtana* literally swarmed on the moors in April. I only saw three or four in the autumn. *P. lipsiana* was occasionally taken, but all were in bad condition. *P. comparana* was common in the autumn, flying among heath in the afternoon sunshine. *P. caledoniana* was much scarcer than usual, all I found were sitting on bracken. While working on a hill near Glen Shee, I accidentally came across *P. maccana*; they were very rare, and required a lot of searching. I only found three specimens; perhaps they might have been more abundant later; I was rather early in the season for them. *Leptogramma scotana* was found on the birch trunks in spring; by sleeving the ♀ on birch trees at home, I managed to breed a nice long series. I left the larvæ to spin up in the sleeve; this was a mistake, as a number spun up on the muslin, and as they are long in turning, the ichneumon flies stung them through the meshes. *Teras contaminana* is local in the North, but swarms where it occurs. I noticed the hawthorn hedges in several places stripped by the larvæ. *Dictyopteryx bergmanniana* was swarming among wild rose; *Penthina betulæana* was not uncommon in birch woods, and *P. dimidiana* occurred occasionally among *Myrica gale* at dusk; the larvæ were not rare in the autumn on the same plant. *P. staintoniana* seems to be common on the Glas Maol among *Vaccinium myrtillus* at 3,000 feet. I picked up several fair specimens, but the majority were worn. All the Scotch *Sericoridæ* were noticed. On sunny afternoons, *Sericoris daleana* was not uncommon in the Blackwood at Rannoch, flying among *Vaccinium*. *S. irriguana* was very common on all the mountains between Braemar and Glen Shee, at a high elevation. They frequent *Vaccinium* and *Alchemilla alpina*-covered slopes, and flutter about in the sunshine. It is a curious fact that I have never seen the ♀ on the wing; on the other hand the ♂s of *daleana* are as plentiful as the ♂. A splendid locality for *irriguana*, is the western slope of the hill at the back of the Hotel at Glen Shee; it is also common on several of the mountains near Loch Laggan. One is never sure where they may come across *Mixodia schulziana*. I have

taken it almost at the sea level, and also at 4,000 feet; this year I boxed a nice specimen off the cairn on the top of Schiehallion. *M. palustrana* was rather common among fir trees in the Blackwood; it was also flying in dozens round the trees in the Altyre Wood at Forres. I caught one *M. ratzeburghiana* among the Forres *palustrana*, the first I ever saw alive. *M. bouchardana* was also found at Forres; they were very scarce. Burghead is the best locality for this species. I believe Mr. Horne captured several while visiting there. *Euchromia arbutana* is a local species, and I only know of two or three localities where it is found, perhaps the best being on a hill side a little south of Kirkmichael in Perthshire; it was abundant there last year, and probably was common this year, but of this I cannot be certain, as it was almost over before I arrived in the district. *Orthotenia ericetana* was not rare; I found it flying in abundance among *Vaccinium* on quiet afternoons. *Cnephasia politana*, generally a common species on the moors, was very scarce; last year the hills around Kirkmichael were alive with it. *Clepsis rusticana*, occasionally turned up on the wet moors. *Phoxopteryx unguicana* and *myrtillana*, were not uncommon; the former flying in the afternoon on the old market green at Kirkmichael, and the latter in the evening, near the same locality, among *Vaccinium myrtillus*. *Grapholitha trimaculana* was not so abundant as in former years. *Phlaodes tetraquetra* was beaten from hazel, but not in the numbers which I have seen on former occasions. One beautiful *P. crenana* was found sitting on a grass culm not far from Kinloch Rannoch. I never saw the species before, and unfortunately did not recognise it until I removed it from the setting board; it was taken in April. The beating-stick dislodged an occasional *Pædisca bilunana* and *Ephippiphora bimaculana* from birch. *E. brunnichiana* and a curious pale variety of the same species were found among *Tussilago farfara* on the railway banks near Pitcaple. I did not find *Coccyz cosmophorana* this year, they seem to follow the example of *Retinia resinana*, and only appear every alternate year. *C. hyrciniana* came tumbling and flying in showers from spruce with every stroke of the stick, and *C. vacciniana* was fluttering about on the moors in the afternoon sun. This has been a good *Retinia* year, all the Scotch species being found with the exception of *resinana* and Mr. Hodgkinson's new one. I noticed larvæ of *resinana* on the fir trees in Elginshire, and there was every appearance of a good crop for 1893. *R. pinivorana* was abundant at dusk, flying round the fir trees. *R. posticana* was beaten out of the small fir trees by day, they were also found fluttering round the trees at dusk and on quiet afternoons. *R. duplana* was found among fir trees, I captured a long series, some of them in the finest possible condition; the best were found by beating, when on the wing they plunge about at a great rate and soon get spoiled. I bred one specimen among old *resinana* nodules. Last year I accidentally came upon *Stigmonota dorsana* flying in the afternoon sunshine near Kirkmichael, in Perthshire. I was unfortunately unable to visit the locality until too late this year; the place where they were found is carpeted with a species of vetch, and I hope to make a big catch one of these days. The only specimen seen this year was taken in the Altyre Wood at Forres; it was small, and not in the best condition. *S. coniferana* was abundant among Scotch fir trees, I bred a number from larvæ which were feeding in the fir buds. *S. perlepidana* was not so common as usual; they occur on all the railway banks near Pitcaple. The white form of *Catoptria*

ulicetana was swarming among whins, I only captured a few of the best marked ones. Last year, *Eupæcilia subroseana* and *Argyrolepis baumanniana* were found in extraordinary abundance near Kirkmichael, in Perthshire. I was rather late for them this year, and the wet evenings destroyed all chance of finding them, so that my catch was rather limited. Mr. Milne caught *baumanniana* while I was with him at Forres; I do not think it is mentioned in Dr. Gordon's list. A variable series of *Tortricodes hyemana*, was brought from Rannoch. I beat them from old oak trees in Carrie Wood by day. I was unable to pay much attention to the *TINEINA*, partly on account of being troubled with my eyes, and pressure of other work giving me less time than I should have liked. Besides, the weather was seldom in a condition to allow a chance of working the smaller fry with profit, and my knowledge of the habits of all the little species is not particularly extensive. As I was unable to name all that were found, I only mention the more interesting of my captures. *Epigrapha avellanella* was common at rest on birch trunks; by picking up all I saw while searching for *Petasia nubeculosa*, I gathered together a nice series. I picked up an empty larva case of *Psyche opacella* in the Black Wood at Rannoch; and several cases of a *Solenobia* on birch trunks at Rannoch, which appear to be quite distinct from the species which frequent stone walls. In all probability this is a "new species," if so, the honour of finding it must be given to Mr. Salvage of Brighton, who pointed it out to me. Several common species of *Tinea* were noticed, but nothing of value. I tried to collect the birch *Micropteryx*, but the net got clogged to such an extent with Aphides, that I gave up in disgust. The beautiful little *Adela fibulella* was not rare among flowers; *Swammerdamia griseo-capitella* was seen among birch, the larvæ were common in autumn. A few *S. naninora* larvæ were found on *Betula nana* near Braemar; this appears to be a very rare species. *Plutella dalella* was not uncommon on the heaths. The best *Depressaria* noticed was *ciniflonella*, which was rather scarce on old stone walls at Rannoch. Two or three *Gelechia sangiella* turned up, and I captured *Cecophora flavimaculella*, *Glyphipteryx fischeriella*, *Argyresthia gedartella*, and other species in abundance, but it is inadvisable to give a further list of the captures in this group since I am not sure that my nomenclature is correct.—WM. REID, Pitcaple, Aberdeen, N.B. February 8th, 1893.

RE-OCCURRENCE IN BRITAIN OF *CATOCALA ELECTA*, BKH.—In the recently-published vol. iv. of *The British Noctux and their Varieties* by Mr. J. W. Tutt, we read on page 130 the account that originally appeared in *The Entomologist*, vol. viii., pp. 282-3, of the capture by Mr. A. C. Vine, of an individual of this species, which was taken at sugar near Brighton, on September 24th, 1875; and Mr. Tutt then adds:—"No other British specimen has been recorded of this species either before or since." Such is undoubtedly the case, and it is therefore all the more satisfactory to me to place on record the occurrence of a second example of this moth in this country, and to be able to claim for it a regular place in the British list. When the peaches and other kinds of wall-fruit in our garden here are ripe, we always have, in addition to many bottles of "beer and sugar mixture" hung on the trees themselves, two or three "wasp-traps" placed near the trees in the hope of drawing off the insects from attacking the fruit: they are easily constructed with a couple of square "hand-lights," but it is unnecessary now to enter into the details. I have always found it a good plan just to keep

an eye on these traps, because a good many butterflies and moths find their way into them, and, curiously enough, the only two specimens of *Catocala nupta* that I have ever met with, were caught here in one of them in September, 1875. When therefore, on September 12th last, among the hosts of other insect prisoners I saw through the dim glass the form of a *Catocala*, the thought at once occurred to me that at last another *C. nupta* had fallen a victim to its greed; but a look at the markings showed that it could not belong to that species, so, after being killed and set out, it was duly labelled, and put aside for future identification. On comparing it lately with Continental specimens I was delighted to find that it was without doubt *C. electa*, as I had thought would probably be the case. Although the right hind wing has evidently been "in the wars," and is unfortunately rather badly damaged, in other respects the moth is in fairly good condition, but neither in it nor in either of the two perfect foreign examples now before me—recently procured through different sources so as to avoid the chance of another species being accidentally sent to me under that name—can I find one of the characters mentioned in Borkhausen's original description of *C. electa*, as quoted by Mr. Tutt, namely the rose-coloured streak which runs from the base of the fore wing as far as the second line. As however Guénée remarks (see *British Noctux and their Varieties*, vol. iv., p. 49) that of several species, including *electa*, some individuals show "a beautiful delicate red tint" on the abdomen, whilst others are without it, I can only suppose that this rose-coloured streak is of the same nature, and also an unreliable character, being sometimes present and sometimes almost or altogether absent.—EUSTACE R. BANKES, The Rectory, Corfe Castle, Dorset. February 6th, 1893.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—February 22nd.—Mr. F. J. Hanbury exhibited, on behalf of Mr. Percy H. Russ, of Sligo, several long and very variable series of *Agrotis tritici*, *A. valligera*, and *A. cur-soria*, together with Irish forms of many other species, some of which were believed to be new to Ireland. Mr. W. H. B. Fletcher and Mr. J. W. Tutt made some remarks on the species. Mr. R. W. Lloyd exhibited specimens of a species of *Acarus* found in New Zealand wheat. He stated that Mr. A. D. Michael had examined the specimens, and pronounced them to belong to *Tyroglyphus farinæ*, a species which had been known for over a hundred years as a destroyer of corn, and was only too abundant all over Europe, and probably over the temperate regions of the world. Dr. T. A. Chapman exhibited, by means of the oxy-hydrogen lantern, photographs of the larva of *Nemeobius lucina* in its first stage, showing the conjoined dorsal tubercles, each carrying two hairs, which are remarkable in being divided into two branches. For comparison he also showed, by means of the lantern, drawing of the young larva of *Papilio ajax*, after Scudder, and a portion of a segment of *Smerinthus populi*, as the only instances known to him of similar dichotomous hairs in lepidopterous larvæ. Mr. Poulton pointed out that he had described the forked hairs of *Smerinthus* in the Entomological Society's 'Transactions' for 1885, and that such hairs were even better developed in the genus *Hemaris* originally described, as he believed, by Curtis. Mr. Poulton also said that he had noticed similar forked hairs covering the

newly hatched larvæ of *Geometra papilionaria*. Mr. E. B. Poulton exhibited, and made remarks on, a number of cocoons of *Halias prasinana*, in order to show the changes of colour produced in them by their surroundings; he also exhibited the coloured backgrounds employed by him in his recent experiments on the colours of larvæ and pupæ, and illustrated his remarks by numerous drawings on the blackboard. Dr. T. A. Chapman read a paper—which was illustrated by the oxy-hydrogen lantern—entitled “On some neglected points in the structure of the pupa of Heterocerous Lepidoptera and their probable value in classification.” A discussion ensued, in which Mr. Elwes, Mr. Poulton, Mr. Champion and Mr. Merrifield took part. Dr. F. A. Dixey communicated a paper entitled “On the Phylogenetic Significance of the Variations produced by differences of temperature on *Vanessa atalanta*.” The President, Mr. Merrifield, Mr. Poulton, Dr. Chapman and Mr. Tutt took part in the discussion which ensued.—H. Goss, *Hon. Sec.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—*February 9th.* Mr. S. J. Capper referred to the death of the Rev. F. O. Morris, which occurred last Saturday, in his eighty-third year.—Mr. C. H. Hesketh Walker read a paper entitled, “Pond life.” Referring to hobbies generally, he considered that natural history was one of the most interesting. He then stated that a stagnant pond was a paradise prolific in animal life, and poetically described it with all its attendant insects, &c., showing by a table that examples of most of the animal kingdom from *Protozoa* to *Mammalia* were to be found therein. Proceeding, he gave brief descriptions of these animals, illustrating his remarks by rapidly-drawn figures on the blackboard.—The President exhibited some fine varieties of *Arctia caja*, also a number of port-wine corks completely riddled by some coleopterous or lepidopterous larvæ; Mr. Locke, *Carabus glabratus*, from Langdale Pikes; Mr. Deville, *Goliathus giganteus*, from Cameroons; and Mr. Gregson, *Noctua triangulum*, from Lancashire and London.—F. N. PIERCE, *Hon. Sec.*, 143, Smithdown Lane, Liverpool.

SOUTH LONDON ENTOMOLOGICAL SOCIETY.—*February 9th, 1893.* Mr. Frohawk exhibited hybernating larvæ of *Epinephela janira*, and stated that they fed intermittently throughout the winter, seldom remaining more than ten or twelve days without food. These varied considerably in size, one being quite half-grown. Mr. Jenner Weir referred to the habit of the larva in resting head downwards on the grass culms, the anal points being evidently protective. Mr. Adkin, a series of *Aplecta prasina (herbida)*, the ova having been obtained from a moth captured at Polegate, Sussex, during the past summer, and the moths emerging during November and December. Mr. Waller, a variable bred series of *Smerinthus tilix*, one of which exhibited a very strong tendency towards melanism, and others, having the markings distinctly asymmetrical. Mr. McArthur, *Taniocampa gothica* var. *gothicina*, *Coccyx cosmophorana* and *Retinia duplana*, and a discussion ensued, Mr. Barrett stating that the original British specimens of so-called *R. duplana*, were, in his opinion, only small specimens of *R. turionana*, although Mr. Warren considered them a distinct species named *R. posticana*. Mr. Adye a variable series of *Boarmia repandata*, taken at sugar in the New Forest, July, 1892. Mr. Weir exhibited a photograph taken from “Insect Life,” for January, 1893, of a twig bearing some two dozen specimens of *Anoxia plexippus*, resting at night during migration, and read a paper which illustrated the migratory instinct of this, and indirectly of other species. A discussion, in which Messrs. Barrett, Weir and Hawes took part, then followed, it being noted that, whereas some

dozen or more captures of *A. plexippus* were recorded for this country, only three were known to have been taken on the Continent of Europe. Mr. Mansbridge exhibited specimens illustrating his paper, and read the following paper entitled "Notes on Melanism in Yorkshire Lepidoptera." He said:—"It has been my good fortune to have spent the last two years in the West Riding of Yorkshire, and during that period, I have especially given attention to the various melanic races of well-known and common species of lepidoptera for which that district is so famous. Although occasional visits were made to the best-known collecting grounds in the county, most work was done in the neighbourhood of Leeds, my residence being at Horsforth, a manufacturing village some five miles out. At the outset, I should mention that this is not intended to be a complete list of the melanic varieties to be met with in the West Riding, but only such as have actually been captured or seen alive by me. I am well aware that there are many strong local races of lepidoptera which the local collectors get every year, but which, owing to very limited opportunities did not fall to my share. The district between Leeds and Bradford, in which Horsforth lies, is crowded with ironworks, forges and mills, while an almost unbroken string of townships connects these two great centres of industry. In consequence, there is an almost incredible amount of smoke turned into the atmosphere, and especially in the neighbourhood of the forges, where it is so dense as to give one the impression of black fog. Much of this smoke is deposited directly on the trees in the form of soot, and a great portion of the remainder is washed down by rain, thus giving rough surfaces, as tree-boles and stone walls, a permanent black coating, and the foliage is so besmirched, that autumn tints in their full beauty are unknown. In addition to the effect of smoke, surfaces are also rendered dark by the rain, which in spring is almost constant. The rainfall for the district is about 36 inches. RHOPALOCERA.—In the butterflies I did not meet with any striking tendency to melanism; a few species are slightly darker, as *P. napi* females. Some of the *Satyridae*, where represented, are slightly duller than the same species in the South, as *Epinephele janira* and *E. hyperanthus*, but *Erebia æthiops* is brighter than examples I have seen from Scotland. HETEROCCERA.—*Sphinges*. The Sphinges met with by me comprise only three species—*Smerinthus populi*, *Ino statice* and *Zygæna lonicerae*; these showed no inclination to darker colouring. *Bombyces*. Neither did the Bombyces show any variation in the species I captured, except *Arctia lubricipeda* and *A. menthastris*; specimens of these two species being taken with larger and more numerous spots than is usual. NOCTUÆ.—I was able to give more time to nightwork, hence a much greater number of species fell to my share, including many interesting varieties. *Acronycta (Viminea) rumicis*.—All my specimens, except those from Wharfedale, differ markedly from the type. The darkest specimens were taken at Horsforth in a wood on the bank of the Aire, and I have others from York and Doncaster, but none so dark as Airedale specimens. It may be instructive to observe that there is no smoke in Wharfedale, otherwise it does not differ from Airedale. The black form is the var. *salicis*, Curt. *A. (Cuspidia) leporina*.—All specimens from Yorkshire are peppered with black, and constitute the var. *bradypporina*, Tr.; an example from Horsforth is slightly darker than the York specimens. *U. megacephala*.—A solitary example from Askham Bog is not darker than the London form. *Xylophasia rurea*.—The many forms of this species are too well-known to require comment; it is interesting to

note, however, that out of a large number of specimens, captured all over Yorkshire, the darkest came from Leeds. *X. monoglypha* = *polyodon*, L.—This insect also, has a wide range of variation—in a locality where a good selection can be made specimens of every shade, from the type through brown to deep black may be taken. This deep black form is far from common, only two or three each season being taken by the York collectors. *Apamea didyma* = *oculea*, Gn.—The deep glossy black of the extreme forms is especially noticeable in Yorkshire specimens. *Miana strigilis*.—The mottled form of this moth is seldom taken in Yorkshire, the dark variety being most abundant. Some of my specimens have a distinct greenish tint, which in certain lights is quite conspicuous. *M. arcuosa*.—At Horsforth occasional specimens showing a tendency to melanism are met with; all the examples of *arcuosa* which I took at Horsforth were slightly, but distinctly, darker than those from Askham Bog, York. *Noctua brunnea*.—My bred series of this moth from the West Riding, is much darker in ground colour than southern examples. They are very beautifully suffused with plum-colour. This plum-colour is not so noticeable in captured specimens. *Triphena pronuba*.—I was not fortunate enough to meet with *pronuba* in any quantity, but the darkest Horsforth form is darker than any I have seen from other localities. The species is taken in almost infinite variety by the West Riding collectors. *Noenia typica*.—The ground colour of this common Noctuid is darker than is the case in southern specimens. *Epunda viminalis*.—My series was bred from larvæ obtained in Teesdale, Yorks., and includes almost all the forms taken in Yorkshire, from typical to deep black. The black form is said to be peculiar to the northern counties.* A rosy variety, sometimes bred from Bishop's Wood, Selby, I was not fortunate enough to obtain. *Euplexia lucipara*.—One specimen bred from Horsforth has the straw-coloured band overspread with purple; more than 100 examples captured at sugar failed to yield a similar variety. *Polia chi*.—My series of *chi* has been selected from about 700 specimens seen in the Horsforth district. The species was very common last season, and while the percentage of dark varieties was rather higher than the previous year, var. *olivacea* was much less common, only two specimens being seen. There seems to be some confusion over the form of *chi* named var. *suffusa*, by Mr. Robson. From the description published by Mr. Tutt in *British Noctux and their Varieties*, most of my specimens might be referred to var. *suffusa*. In order to settle my doubt on the subject, I showed the whole of the insects captured this season to Mr. Porritt, who pronounced that there was not one *suffusa* among the lot, at the same time showing me his series of Huddersfield *chi*. A strong difference was at once apparent, the true var. *suffusa* being a case of true melanism—or perhaps better, melanchroism. I am not now referring to the black form of *chi*, first exhibited by Mr. Porritt in 1890, from which the *suffusa* form is quite distinct. I have seen boxes of *Polia chi* from all parts of Scotland, and the North of England, but have only heard of one case of var. *suffusa* having been taken outside the Huddersfield district. At Huddersfield, in some years, about 50 % of those bred are the melanochroic form, which alone should be called var. *suffusa*. *Aplecta nebulosa*.—I have two dark suffused specimens bred from Horsforth larvæ. Mr. Carrington told me that a black variety was taken in the district, but although I searched diligently,

* Occurs freely at Derby.—Ed.

both for larvæ and imagines, I was not fortunate enough to meet with the variety. This form would probably be identical with the black specimens recorded two years ago from Warrington. Specimens which I collected in Edlington Wood, Doncaster, do not differ from the southern type. *Hadena oleracea*.—This species bred from Horsforth larvæ is distinctly darker than specimens from the London district. *Hadena dentina*.—Four specimens only were captured:—(1) very dark, almost black; Horsforth. (2) Dark grey; York. (3) Markings very indistinct; Grass Wood, Yorks. (4) Type; York. Mr. Porritt told me the dark form (1) is met with every year at Huddersfield in some abundance. I find from the York collectors, however, that it is not taken in the East Riding. GEOMETRÆ.—*Odontopera bidentata*.—Very dark specimens of this moth are taken in the Horsforth district, together with the type. Extreme forms are almost as dark as Forres specimens. *Boarmia repandata*.—Four black specimens in my series represent the Horsforth form *as bred*. I found eight larvæ, and from them I obtained eight black imagines; but of 50 or sixty captured specimens, not one was so dark. When I first bred the insect, I thought I had got Mr. Porritt's black form; but on comparing with his well known varieties, mine were found to be much lighter. Black specimens, said to be identical with those bred by Mr. Porritt from Huddersfield larvæ, were bred by Mr. Hall of Sheffield, from larvæ found in his district. The dark Horsforth form was well known to both these gentlemen, and they state that it is abundant every year. *B. repandata* from Grass Wood near Skipton, Yorks, and from York, are much lighter than Horsforth captured specimens. *Phigalia pedaria* = *pilosaria*, Hb.—Occasionally a very dark unicolorous olive-black variety is taken in the West Riding; it has been recorded from Harrogate and Barnsley. My specimen was taken in a very boggy wood at Otley, near Leeds. I worked hard last season, but did not meet with another var. although the type was common. *Tephrosia biundularia*.—The northern* form of this insect is well known = var. *delamerensis*. It is taken all over Yorkshire where the type occurs, and recent records show that it is rapidly spreading. My series was taken in Edlington Wood, near Doncaster. *Hybernia leucophæaria*.—The var. *marmorinaria* is well known to the York collectors; it occurs in about the same proportion to the type as in the southern woods. *Hybernia aurantiaria*.—My Yorkshire examples of this insect are much deeper coloured and have a larger area of purple on the fore wings, than have specimens from Surrey. Typical Horsforth examples are similar to those from Askham Bog and Sandburn Wood in the York district. I have two extremely pale forms from Horsforth, but they are quite abnormal there. Considering the rapid spread of the deeper coloured pigment in the allied species *H. marginaria*, and the strong tendency in the same direction exhibited by *H. defoliaria*, I think we may expect a similar advance towards melanism from *H. aurantiaria*; and it is in the West Riding where it should be looked for, since that is the district where the other members, nearest it in the genus, were first found to vary. *Hybernia marginaria* = *progemmaria*, Hb.—The dark purple form var. *fuscata* occurs abundantly at York and Huddersfield; but I have only taken the intermediate suffused form at Horsforth, the species not

* This is not particularly a northern form. It occurs at Mansfield, Birmingham, Derby, in Staffordshire, and many other localities.—Ed.

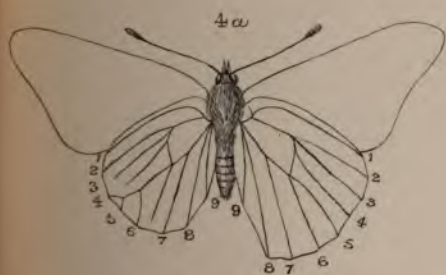
being at all abundant in that locality. *H. defoliaria*.—All forms of this variable insect are abundant at Shipley Glen, near Bradford; and among them a purple unicolorous variety is taken. *Cheimatobia brumata*.—I have never seen it recorded that melanism exists in this common species, and I take this opportunity of calling attention to the fact. I have several specimens of a deep brownish purple from Sandburn Wood, Norfolk; also the same form from Horsforth, and one from Wimbledon Common; these have been selected from thousands examined during the last six years."

Mr. Tutt, in proposing a vote of thanks to Mr. Mansbridge, remarked, that contrary to the suggestion in Mr. Mansbridge's paper, dark *Miana strigilis* with a greenish tinge were not confined to Yorkshire, but were found somewhat commonly in most localities, that the dark form of *Næmia typica* was very generally distributed, and that the darkest forms of *Triphæna pronuba* were captured at Deal and other southern localities; that the specimens of *Cleoceria viminalis* exhibited by Mr. Mansbridge were in no way so dark as those sent out by the Barnsley and Derby collectors, and were very like the Darlington form. He also pointed out that Mr. Mansbridge alone was in error in his general discrimination of the varieties of *Polia chi*. The form from Bradford (of which the Huddersfield specimens were an extreme type), were the originally described var. *suffusa*, and in this form the males and females both have a dull grey ground colour, but that the specimens exhibited by Mr. Mansbridge had the ground colour of the males essentially white, and this was generally so at Leeds, and in fact within a few miles of Bradford. At Huddersfield, too, where the darkest known specimens of this species occurred, the white form occurred in certain localities only a few miles out. It was one of those species in which local forms were restricted remarkably. Mr. Mansbridge's specimens exhibited the ordinary sexual variation, but he had nothing corresponding with the Bradford form, still less like the extreme Huddersfield var. *nigrescens*. The *Aplecta nebulosa* exhibited were the ordinary Yorkshire form = var. *bimaculosa*, but less dark than those from Warrington. Melanic *Cheimatobia brumata* were pretty generally distributed in the neighbourhood of large towns, and in no way peculiar to Yorkshire; and *Hybernia aurantiaria* from Glasgow and Morpeth were generally darker than the Yorkshire specimens; and specimens from Epping Forest were frequently as dark as those exhibited. The females of *Larentia didymata* generally exhibited considerable variation in colour in most localities, and the specimens of *Melanippe galiata* from the neighbourhood of Huddersfield were of the normal Lancashire type, with the central band especially dark and strongly marked. He doubted the correctness of Mr. Mansbridge's reference to Forres *Odontopera bidentata* being exceptionally dark, as his experience of Scotch specimens of this species did not bear out this suggestion. The dark form of *Boarmia gemmaria* exhibited agreed generally with the London var. *perfumaria*, whilst the *B. repandata* showed but little approach to the dark specimens bred by Mr. Porritt from Huddersfield, or by Mr. Batty from Sheffield. The whole subject of melanic variation was excessively complex. The rainfall of West Yorks. was rather heavy, and the soil retentive, the surface soil generally dark, and the trunks of trees in the neighbourhood of the large towns considerably blackened by soot and rains, and these made a strong primary instalment of facts bearing on the production of melanic forms, which needed only the most general action of "natural selection" to work on. But these elementary principles were

known now to everybody, and further experiment and observation would have to be rather in the direction of physiological facts and principles. The vote of thanks was seconded by Mr. C. G. Barrett, who, among other remarks, referred to the general distribution, at the present time, of the dark variety of *Phigalia pilosaria* in southern localities, especially in the neighbourhood of London.—Ed.

February 23rd, 1893.—Mr. S. Edwards exhibited a box of exotic lepidoptera (butterflies) illustrative of mimicry from widely different localities. Mr. South, series of *Cerostoma radiatella*, Don. and *C. costella*, Fab., and remarked on the number of varieties of *radiatella*. Mr. Auld, a box of Coleoptera collected near the Cape of Good Hope. Mr. Barrett, drew attention to a method of transferring the scales of the wings of lepidoptera to paper, as exemplified by a sample from Herr. Aug. Hoffmann; and Mr. Tugwell noticed that the scales were necessarily reversed, and the body, eyes, antennæ, &c., painted in. Mr. McArthur shewed a method of steadying and securing an insect by means of a slip of paper doubled over, when—for any reason—the pin through the thorax had been rendered useless. Mr. Robert Adkin exhibited a short series of *Spilosoma mendica*, Clerck, bred from larvæ found in Aberdeenshire, the males being of a brownish colour. Mr. Tugwell referred to the fact that specimens of the male *S. mendica* from Barnsley were light, whereas those from Huddersfield were dark forms as exhibited recently by Mr. G. T. Porritt. Mr. Billups, some curious forms of Hemiptera, Homoptera, Hymenoptera, Neuroptera and Orthoptera, from a mission station in the Demerara River, British Guiana, and called attention to a fungoid growth attached to a specimen shewn, belonging to the Homoptera. Mr. Billups said it closely resembled, if it was not the actual species known as *Torrubia robertsii*, which attacks certain species in New Zealand. Mr. J. Weir exhibited specimens of Euploëine butterflies from three distinct groups, viz., *Crastia core*, *Narmada roceoides*, and *Pademna kollari*, and read an interesting paper on "Isochromatous Lepidoptera." Mr. R. Adkin also exhibited a series of *Diurnæa fagella*, Fab., from Lewisham, and mentioned several species, notably *Eupithecia rectangulata*, L., and *Miana strigilis*, Clerck, which had assumed a marked tendency towards melanism in the London district of late years; agreeing with Mr. Mansbridge that climatic conditions did not appear to account for the change.* A discussion ensued, in which Messrs. Barrett, McArthur, Tutt, Mr. Robson of Hartlepool as a visitor, and others took part. The President then called upon Mr. Robson who exhibited a short series of *S. mendica*, Clerck, of which one specimen, a female bred at Hartlepool, was of a distinct cream colour. Mr. Robson stated that this species was common in Northumberland and Durham along the coast, and that the male insect occasionally varied to a colour intermediate between the English and Irish forms. Mr. Robson also exhibited dark specimens of *S. populi*, L. from Aberdeen, and light forms (females) bred at Hartlepool. A discussion followed, Mr. R. Adkin stating that *S. mendica* was not a common species in Scotland; and Mr. Tutt and Mr. J. A. Clark each noticing the occurrence of other varieties of the species.—F. W. HAWES and H. WILLIAMS, *Hon. Secs.*

* Lewisham is in the Metropolitan area and now well within the range of London soot and fogs. The tree-trunks are well blackened, and *D. fagella*, *E. rectangulata*, etc. are essentially trunk resting species. A very elementary knowledge of "natural selection" appears to solve the question.—Ed.



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THE GENUS *XANTHIA*:

WITH NOTES ON VARIATION, HABITS AND AFFINITIES.

By J. W. TUTT, F.E.S.

(Concluded from page 71.)

Xanthia fulvago, Linn.—This species has always been one of those in which I have interested myself, and *cerago* as we frequently call it, is likely to attract attention, not only from its pretty tints and the variability of their arrangement, but from the fact that it is a species widely distributed in Britain and, if searched for, likely to be captured by most collectors themselves. The ground colour varies from a pale yellow, almost approaching white, through a clear citron yellow to a decided orange (much the same tint as we find in *flavago*). Essentially these may be classified under two heads—the pale yellow and the orange yellow. The transverse lines and markings are of a red colour but occasionally they become strongly purple (in the *Brit. Noct. and their Vars.*, iii., p. 10, line 13, “yellow” is a misprint for “purple”) whilst frequently they are altogether obsolete. Some localities, as may be expected, are more prone to produce variation in certain directions than are others, and we find that whilst certain localities give a very large percentage of obsoletely marked specimens, others yield none, although every district produces some specimens much less marked than others. On the other hand, occasional specimens with very strongly marked and clearly developed central bands are found, but these are rare, much rarer than obsoletely marked specimens, although this is strange, considering that four-fifths of the specimens one breeds or takes, have well-characterised markings, and one would naturally expect to find an increase of colour to be a more common form of variation, considering the development of the markings of a large percentage of the normal form. There are absolutely obsolete specimens without any spot or markings whatever, but generally those which are most devoid of markings have a characteristic dark central spot (the lower half of the reniform). Strange to say, that at Reading, whence I have received a long series from Mr. Holland, although faintly marked specimens are not uncommon, specimens with only the central spot are rarely to be met with. The varieties of this species may be classified as :—

- 1.—Pale yellow, with lower part of reniform forming a dark spot (*flavescens*, Esp.).
- 1A.—Pale yellow, with indistinct red markings (*cerago*, Hb.).
- 1B.—Pale yellow, with distinct red markings (*fulvago*, Linn.).
- 1C.—Pale yellow, with purplish band = *cerago*, Newman (*suffusa*).
- 2.—Orange yellow, with central spot (*obsolata*).
- 2A.—Orange yellow, with indistinct red markings (*imperfecta*).
- 2B.—Orange yellow, with distinct red markings (*aurantia*).
- 2C.—Orange yellow, with distinct red band (*virgata*).

The eggs are laid in the autumn (in August and September) in neat rows of two to ten, along the willow buds, but they do not hatch till the spring (in March) with the swelling catkins, when the larvæ can be collected in large numbers from the catkins and buds of the willow, and one has only to collect a large number of catkins of willow from various localities and tie them up in linen bags to make sure of a rich harvest of moths throughout the summer and autumn months, for large numbers of species besides the two common *Xanthiæ* may be thus obtained. Later on, the larva leaves the catkins and lives on the ground. It is exactly like that of its congener *flavago* when full-fed, but, when young, the latter has the dark colour on the back of each segment formed into an irregular quadrilateral blotch. A very complete and well-drawn comparison between the larvæ of *fulvago* and *flavago* is written by Mr. Buckler in the *Ent. Mo. Mag.*, vi., pp. 263-264. The larva forms a cocoon, just under the surface of the ground, in May, but like so many of the species that feed up rapidly in the early part of the year, does not pupate for a considerable time. It is well distributed, being taken over the whole of England and Scotland, extending into the Tay, Dee and Moray districts, and probably reaching Sutherland on the east coast and Solway and Clyde (probably to West Ross) on the west coast. It is also well distributed in Ireland, Birchall giving County Wicklow, where he records it as common. It also occurs commonly in the neighbourhood of Derry. Staudinger gives as its range:—"Central and Northern Europe (except Polar Region); Piedmont; S. Russia; Altai; Amur."

Xanthia flavago.—This may be looked upon as probably the commonest species. It abounds in many localities, and has an equally wide range with *fulvago*, to which it is very closely allied. Strange to say, however, this is, compared with the latter, a most constant species. The ground colour is a very little richer than the orange form of *fulvago*, and the red markings do not undergo anything like the range of variation of its ally, in fact, with the exception that the dots forming the central band are sometimes much broken up, whilst in others they are united, and the band becomes solid, there is no variation noticeable. The tint of red is occasionally very bright = var. *ochreago*, Bork.; the normal form, with an almost complete and rather dark central band is the *flavago* of Fabricius, whilst that in which the band is much broken is the *togata* of Esper. The name of this species has recently been altered by Scandinavian writers to *lutea*, Ström.

The life-history of this species runs quite parallel with that of

fulvago. The eggs are laid in rows of three to ten along the willow and alder buds, in the autumn, and they hatch in the spring as the catkins begin to expand. They live inside the catkins, and although the larva is to be generally distinguished from that of *fulvago* when young, separation seems impossible when they get older. The larva lives on the ground when nearly full-fed, forms a cocoon in May, and remains unchanged until July, when it pupates. Mr. Reid remarks that this species and *fulvago* invariably emerge in the afternoon.

It is widely distributed in Britain, occurring abundantly in some seasons both at sugar and flowers (especially those of certain grasses). Its distribution in Scotland is practically identical with that of *fulvago*, and it is abundant in certain Irish localities—Wicklow, Dublin and Derry. The prettiest forms of var. *ochreago* I have ever seen came from Morpeth, where they were bred or captured by Mr. Finlay. Staudinger gives as its range:—"Central Europe; S. Sweden; Livonia; Finland; N. Italy; S. Russia; Armenia; Altai; Eastern Siberia."

Xanthia gilvago. This appears to be a somewhat near ally to *X. fulvago*, although its habits and the plants it affects make a duller colour more useful for protective purposes. Thus we find the specimens of a much duller orange tint—almost brown, and the darker shades on the wings are of a somewhat smoky hue. In one of the Continental forms the ground colour is reddish yellow and there is no smoky shading: this is the *palleago* of Hübner, and Guenée very aptly compares this form with the *flavescens* form of *fulvago*. On the other hand, there is a form in which the whole central area of the wing and even the basal area and inner margin are decidedly smoky in colour; this is known as var. *suffusa*, and appears to be more common in Britain than the type, which has the central area simply shaded with fuscous spots without being developed into banded form. Guenée refers to it as being "exceedingly variable, less, however, than *ocellaris*." He also differentiates it from *ocellaris* (*vide, British Noctuae and their Varieties*, iii., p. 14.) On the other hand *gilvago* and *ocellaris* are united by Fuchs and Rössler (*vide, British Noctuae*, etc., iv., p. 122). My ignorance of the latter species prevents me giving an opinion on the matter.

The egg is laid in the autumn, hatching the following spring. It feeds at first on the seeds of wych-elm, and is exceedingly like the larva of *Mellinia ferruginea* (*circellaris*) when full grown. Buckler describes the larvæ in the *Ent. Mo. Mag.*, iv., p. 156. The Rev. G. H. Raynor records a very depraved taste in the species, some larvæ he beat eating those of *Thecla w-album* kept with them, but it is probable that the pangs of hunger makes many larvæ cannibal, even although this be not their usual custom. The young larvæ of this species can be beaten in June, and these appear to live in a state of nature differently from *citrago* (between leaves) or *fulvago* and *flavago* (in catkins). The species frequently abounds in the larval state in different parts of Yorkshire and Derbyshire. At Cambridge, the imago sometimes swarms at the gas-lamps on the outskirts of the town. At Reading, it frequently comes somewhat freely to sugar. Of their attraction to light, Mr. Holland suggests that they come to gas-lamps in the town more than any other *Xanthia*, probably not because they are more easily so attracted than their brethren, but rather because of the avenues of elms among the lamps in the suburbs of the town. It is recorded from Flintshire, but I know of no Irish

captures, and Dr. Buchanan White tells me that it was once said to have been taken in Sutherland, but the evidence was not sufficiently satisfactory. I never remember having seen or heard of Irish or Scotch specimens. Dr. Staudinger gives as its range:—"Central Europe;" and for var. *palleago*:—"S. France and N. Italy (?)."

Mellinia circellaris.—It is very doubtful whether this species, which has of recent years been placed in *Xanthia* by British entomologists, and in *Orthosia* by German entomologists, is not so classified rather on superficial resemblances than because there is any real affinity, and, superficially, the imago would incline one rather to place it with *Orthosia* than *Xanthia*. It has been placed in the latter genus most likely because of the similarity of the larvæ of this species with *gilvago*, and this in itself would be a good reason if the character of the egg and pupa supported it; but alone, we have to bear in mind that many full-grown larvæ of Nocturæ with similar habits are very much alike, although the egg, pupa and imago show them to be widely different. So it may be here, and until some proper study has been made of the egg and pupa, I prefer retaining Stephens' genus for the species. *Circellaris* is, of course, altogether larger, of a different colour, and with different markings from any other of the usually supposed *Xanthia* species. It varies in ground colour from a pale ochreous brown, through a bright reddish-brown, to a deep fuscous. These three forms have all been named by old authors, the pale form being Hufnagel's type; the red form, Hübner's *ferruginea*; whilst the suffused form is Hübner's *macilentæ*.

The eggs are laid in the autumn, usually on wych-elm, and it is generally widely distributed and abundant. The larva hatches in the spring, and is frequently beaten with that of *gilvago* from wych-elm. When nearly full-fed, except that the larva of *circellaris* is larger, they are much alike, and the brotherhood in habit has possibly led to a similarity of appearance which has given the notion of brotherhood in structure. At any rate, Mr. Buckler writes of this species under the name of *ferruginea*:—"Though a trifle larger, yet in form and structure this larva closely resembles that of *gilvago*, with the following exceptions:—1. The ground colour is of a browner tint, sometimes of an ochreous brown. 2. The series of dark central marks on the back, with their dark wedges, assume together more compact forms of an urn shape, being attenuated behind, so that a constant character appears in the hinder pair of tubercular dots being outside the dark urn shapes. On referring to figures of this species drawn in 1861 and 1865, the same characters are apparent, though two of them found under common ash varied much in colour, one being a grey variety and the other a brighter and more distinctly marked example than any of those on wych-elm" (*Ent. Mo. Mag.*, iv., p. 180). The larva is also recorded from flowers of ash, at Box Hill, by Mr. Machin; on green seeds of wych-elm, at Llanelly, by Miss Perkins. It is very generally distributed in England and Wales, and is stated by Birchall to be "common everywhere" in Ireland. In Scotland, it appears also to be generally distributed, although I have Scotch specimens only from Aberdeenshire. Staudinger gives as its range:—"Central Europe; Sweden and S. Finland; Piedmont and S. Russia."

THE GENUS *ACRONYCTA* AND ITS ALLIES.

By Dr. T. A. CHAPMAN.

(Concluded from Vol. III., page 279).

As to the affinities of *Acronycta*, it will be seen that I have rather shown that certain species (*coryli*, *cæruleocephala*, and those in the genus *Bryophila*) are not related to them, than demonstrated what species and families are allied to them. The figures in Plate ix., except *A. (Cuspidia) strigosa*, which is rather out of place, and *D. pudibunda*, all illustrate that the species represented do not, at the stages shown, present any definite *Acronycta* characters. The egg and larva of *B. perla* might be those of an *Agrotis*, *Hadena*, *Xylophasia* or *Tæniocampa*, but certainly not of an *Acronycta*.

The larva of *Demas coryli* is clearly a *Liparid*, not therefore, perhaps, so very remote from *Acronycta*, but, still, distinctly a *BOMBYX* (if that name still has a definite collective meaning) and not a *NOCTUA*. *Diloba cæruleocephala* in its first larval stage has some aspects of a *NOCTUA*, but is more *Notodontid*. The pupa of *D. coryli* is not that of a *NOCTUA*, though the character of the anal armature has some resemblance to various *NOCTUA* forms. The question of affinities shown by the anal armatures of pupæ, becomes to me a more difficult one, the larger number of pupæ I examine; and I have been reduced to considering them of little value, except when closely allied species have a common type of armature, as—for example—the pitchfork of *Tæniocampa* (a modification of the *Hadena*) type, and the two lyre-shaped spines of *Xanthia* (*Orthosia*, &c.) with their hair-like companions. As regards the latter, I recently examined the pupa of *Xanthia citrargo* (rather, perhaps, a *Cosmia* than a *Xanthia*) and found the anal armature—with two dorsal spines, and four ventral ones—closely resembling that of a *Cuspidia*. *D. pudibunda* illustrates a *Liparid* with unequal segments, 3, 4, and 9 being "weak."

I have noticed the various criticisms that have been passed on my giving new names (where there are, certainly, already quite enough) to the sections of *Acronycta*. I have not been able to determine that any of the old names will express what I desire to insist on in the case of *Cuspidia* and *Viminia*. These are two very distinct divisions, each, no doubt, capable of sub-division; but the grand distinction between them is of a much deeper and more fundamental character than any that can be drawn within either sub-genus. *Semaphora* and *Triena*, *Hyboma*, *Jochoæra*, &c., may be used for sub-divisions of *Cuspidia*, but none of them admits of the collective meaning which that term is intended to indicate. Further, as regards *Viminia*, it includes as sub-genera not only some that are usually regarded as sub-genera of *Acronycta*, but also some that have been held to be quite distinct, viz., *Arsilonche* (*venosa*), *Simyra* (*nervosa*) and *Clidia* (*geographica*), yet none of them seems available for the whole division. As to *Bisulcia*, as this only includes one species that I have examined, I think it extremely likely that this name must give place to some older name; unfortunately, my critics, who are much better synonymists and bibliographers than myself, have made rather discordant statements as to which that older name is, and I feel quite unable to decide the point.

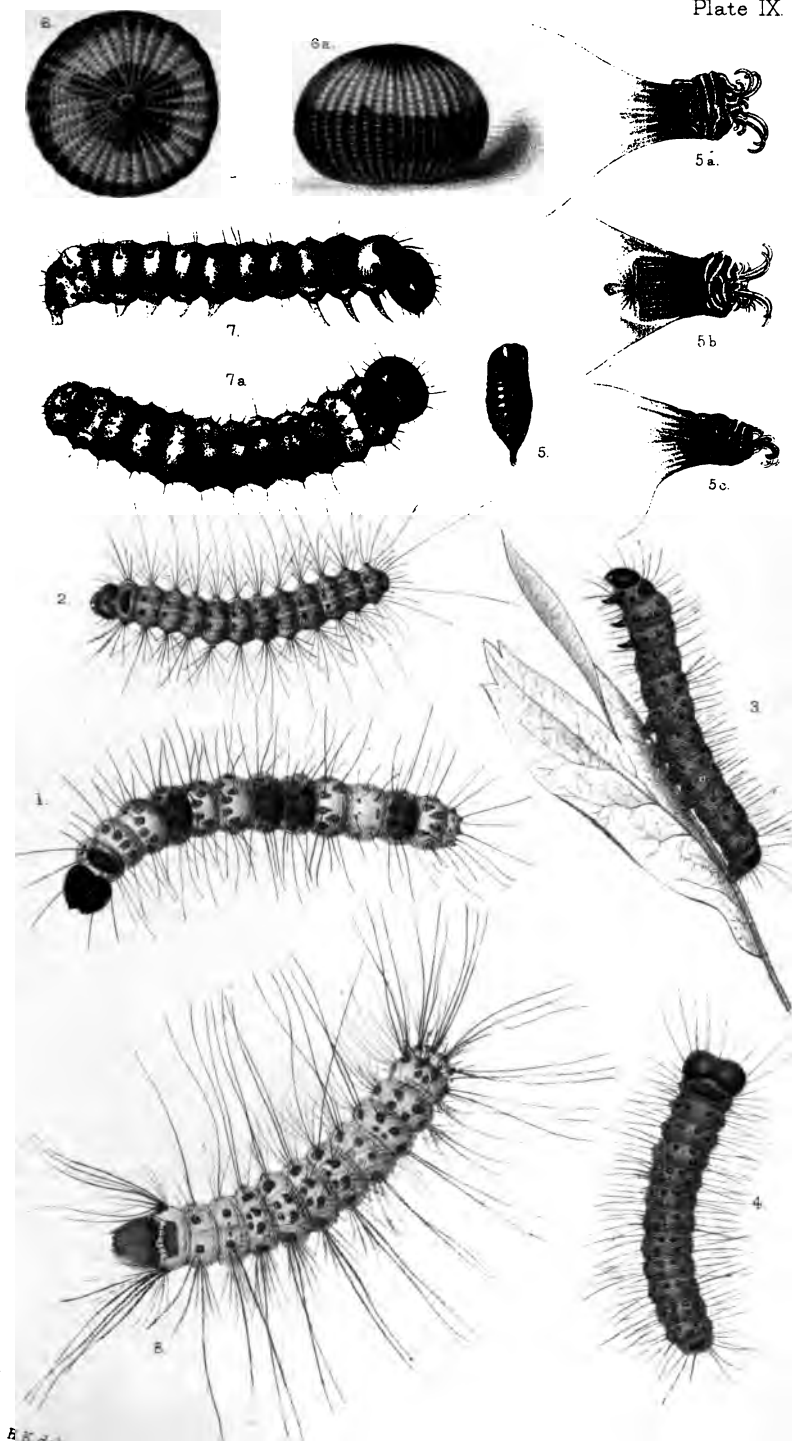
Description of Plate ix.

- FIG. 1.—Larva of *Acronycta (Cuspidia) strigosa*, 1st skin $\times 24$ dm.
 „ 2.— „ „ *Demas coryli*, 1st stage $\times 20$ dm.
 „ 3.— „ „ *Diloha cæruleocephala*, 1st stage $\times 15$ dm.
 „ 4.— „ „ „ „ „ (newly hatched) $\times 25$ dm.
 „ 5.—Pupa of *Demas coryli*, nat. size.
 „ 5a.— „ „ „ „ „ anal armature, dorsal view $\times 15$ dm.
 „ 5b.— „ „ „ „ „ „ ventral „ \times „
 „ 5c.— „ „ „ „ „ „ „ lateral „ \times „
 „ 6.—Eggs of *Bryophila perla*, dorsal view $\times 34$ dm.
 „ 6a.— „ „ „ „ „ „ lateral „ $\times 34$ dm.
 „ 7.—Larva of „ „ 1st stage $\times 30$ dm.
 „ 7a.— „ „ „ „ „ „ $\times 30$ dm.
 „ 8.— „ „ *Dasychira pudibunda*, 1st stage $\times 15$ dm.

SCIENTIFIC NOTES.

LITHOCOLLETIS CERASICOLELLA, A SPECIES NEW TO THE BRITISH FAUNA, AT DONCASTER.—I have great pleasure in adding the above species to the British List. Last autumn I collected the mines of the larva in the leaves of *Prunus avium*, and I have now bred a few of the imagines. One of the latter I have sent to Mr. Barrett, who confirms my opinion that it is undoubtedly *Lith. cerasicolella*, Her.-Schäffer. Appended is a description of the mine, the larva, and the imago. The mine is elongate, and is placed between the lateral veins of the leaf of *P. avium*, reaching from near the mid-rib towards the margin. The larva is pale yellow, second segment orange-yellow. Head, dark brown or black. Legs, grey. The imago belongs to the *pomifoliella* group, and is very like *spinicolella*; but the following points serve to distinguish it from that species. The first dorsal streak is more gradually curved, and its apex does not point in a line continuous with the basal line. The third dorsal streak is very small, and never joined to the third costal streak. The third and fourth costal streaks are united by some white scales above the black sub-apical spot.—H. H. CORBETT.

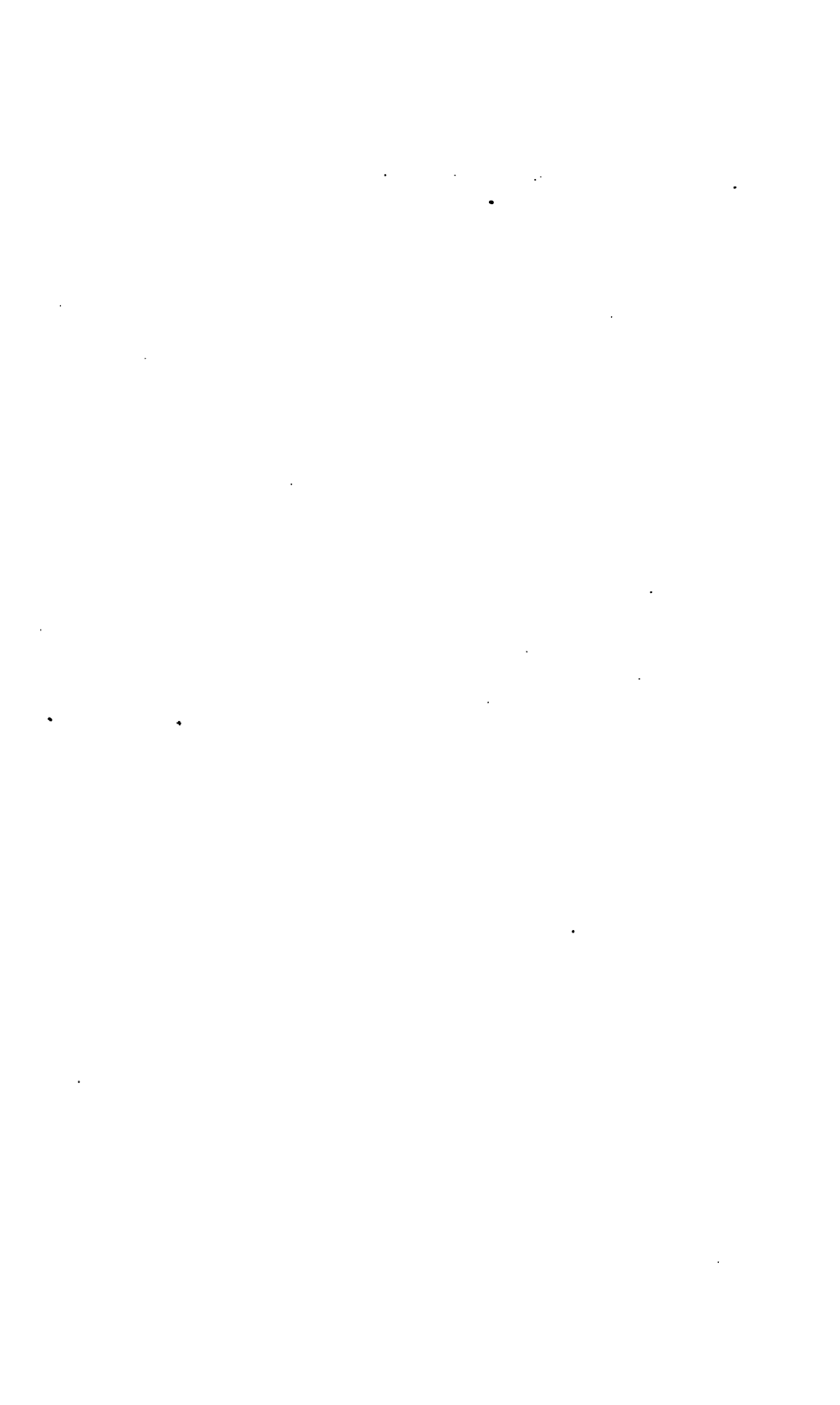
CARADRINA AMBIGUA AND C. SUPERSTES (Plate c, figs. 4-5).—Perhaps two of the most puzzling NOCTUÆ which have been introduced into the British list are, *Caradrina superstes* and *C. ambigua*. There can be no doubt that the genus *Caradrina* is puzzling at the best of times, and there are many experienced lepidopterists who cannot now with any degree of certainty separate the two common (in the South of England) species *C. blanda* and *C. alsines*. Different as the normal specimens of these appear to a trained eye, there are occasional specimens about which it is difficult to give an opinion with any amount of certainty. The two species *ambigua* and *superstes* seem to hold a similar close brotherhood and relationship, and strangely enough, the general difference observable, is to a great extent that observable in the more ochreous *alsines* and the greyer *blanda*, *ambigua* being of an ochreous



E. K. del.

West, Newman, Chromo.

The Genus *Acronycta* and its Allies.



tint, and *superstes* decidedly grey. Similar as are the fore wings of these species to those of *blanda*, the distinctly pearly white hind wings of both sexes of these species immediately distinguish them. Reference to Plate c, figs. 4 and 5, will at once make this clear. Besides the difference in colour, I must own that I am unable to point out any constant distinguishing mark, unless perhaps, the rather more angulated elbowed line, with its more strongly developed inner row of black dots (not well shown in Plate c, fig. 5), in *superstes*. All Continental entomologists are, however, agreed as to their distinctness, and probably the close resemblance would disappear, had we enough examples to make ourselves really conversant with them. Mr. Vine first recorded *ambigua* from Brighton, but the specimens captured by Mr. Hodges, at Freshwater, and recorded as this species, are referable to *superstes*. I have taken specimens of both *superstes* and *ambigua* at Deal, and of *superstes* certainly, and *ambigua* probably, in the Isle of Wight. There is no need to go through the history of these species, detailed at length in *Varieties of British Noctua*, vol. i., pp. 148-149, but I would call attention to the form described as var. *suffusa* (l.c., p. 149), and captured by Mr. Russ at Sligo. I have never seen another specimen. Such a form with its black fore wings, and white hind wings, is striking enough. I trust that the publication of these figures will lead to the further capture and subsequent determination of the species on the south coast. I may add, that on the Continent, *ambigua* is a common species in many localities; *superstes*, very local, or rare.—J. W. TUTT. March 29th, 1893.

CARADRINA SUPERSTES.—This species, which to me appears very distinct from *C. blanda*, enters the British list by two specimens, captured by myself in the Isle of Wight, in July, 1888, when my acquaintance with, and knowledge of the NOCTUÆ were of a very superficial character. They were first referred by Mr. Tutt to *C. ambigua* (fig. 5), which had already found a place in our list, through specimens captured by Mr. Vine at Brighton and Mr. Tutt at Deal. Further comparison of the above, and of specimens captured in Guernsey, in 1890 and 1891, have proved the distinctness of this species from *C. ambigua*, and, I think, no one knowing the species, either alive or in the cabinet, could confuse it with any form of *C. blanda*, hitherto captured in England. The circumscription of the reniform and the orbicular, and also the outside edge of the costal margin, are of a very decided pale yellowish tinge, quite distinct from the light cold grey of the same markings in *blanda*, whereas the tint of the upper wings is of a light cold shade of grey, differing from the warmer, browner shade of *blanda*. In Guernsey, where I have taken several specimens in different seasons, while specially working for the species, and alive to its distinctness, I have always found the greatest ease in recognising it at a glance amongst numerous *C. blanda*, a fact, which I think my friend, Mr. W. A. Luff, will recollect, from one special occasion when we were sugaring together. My two original specimens (from the Isle of Wight), were taken by myself at sugar, on an evening in early July, when NOCTUÆ were coming very freely to sugar, the *Agrotidæ* being particularly well represented, and although working each season since in the same locality, I have never had the good fortune to meet with the species there again. ALBERT J. HODGES. February, 1893.

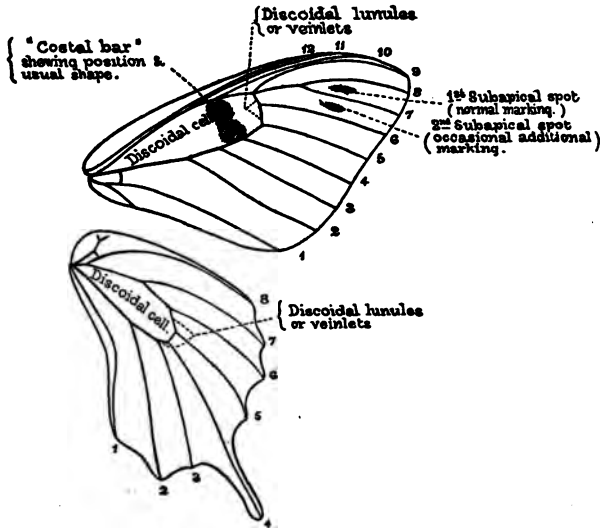
EUPECELIA SUBROSEANA: A QUERY!—As I notice, on p. 85 of the *Ent. Record* for March, a statement by Mr. W. Reid, of Pitcaple, to the

effect that *Eupacilia subroseana* was very abundant near Kirkmichael, in Perthshire, "last year" (I presume he means "the year before last," as immediately afterwards he speaks of being "rather late for them this year," which must be a slip of the pen for "last year," since his note is dated February 8th, 1893), I should like to ask Mr. Reid whether he is quite certain that the insect referred to is the true *subroseana*, as originally described under that name by Haworth. Many years ago the richly-coloured Scotch form of *E. ciliella* was erroneously called *subroseana*, but in some most interesting notes in *Ent. Mo. Mag.*, v., pp. 244-246, and xi., p. 194, Mr. C. G. Barrett set the whole matter straight, and proved conclusively that Wilkinson's description of, and localities for *subroseana*, as well as the localities for it (and, I may add, the description, also) given in Stainton's *Manual*, really refer to the northern form of *ciliella*, and not to the "genuine article." Concerning the latter, Mr. Barrett remarks in *Ent. Mo. Mag.*, xi., p. 194, "It appears in this country to be confined to the woods of the South, and is far from common;" and it is a well-known fact that the larva feeds in the heads of golden-rod (*Solidago virgaurea*). The two species may be readily distinguished by the following characteristics:—*Subroseana* has the fore-wing broad, with the costa and hind-margin rounded; fascia, oblique, but not particularly so; basal area of wing of the very pale and peculiarly ochreous ground colour, practically unclouded; outer area *much clouded* with pinkish-brown, especially towards the apex; hind-marginal fringes, which are intersected by a dark transverse line, with the terminal portion marked with dark fuscous. *Ciliella* has the fore-wing *long and narrow*, acutely *pointed* at the apex, and with the costa and hind-margin nearly straight; fascia, very oblique; ground colour much less strongly ochreous than in *subroseana* (though the Scotch form is more ochreous than the English one), and the contrast in colour between the outer and the basal portions of the wing much less noticeable; hind-marginal fringes, which are intersected by a dark transverse line, with the terminal portion clean and not marked with fuscous. It appears to me most probable that Mr. Reid has been misled by the errors in Stainton's *Manual*, or in Wilkinson's *British Tortrices*, and has mistaken the Scotch form of *ciliella* for the true southern *subroseana* of Haworth, though, of course, I am quite open to correction in the matter.—EUSTACE R. BANKES, The Rectory, Corfe Castle. *March 20th, 1893.*

VARIATION.

ON THE VARIATION OF *PAPILIO MACHAON*.

Although *Papilio machaon* at a first glance presents nothing very striking in the way of variety, yet a careful examination of a number of specimens reveals very significant aberrations in some of the markings. As I shall frequently have to refer to the nervures to indicate the locality of different markings, I have prepared a diagram showing the neururation of the wings, and have adopted the simpler method of using numbers throughout.



I will commence with what appears to be the most important variation, *viz.*, the development of red scales in the posterior wings, most often to be seen in the submarginal yellow lunules; there are six of these lunules, and it is no uncommon thing to see nearly a whole series (British) showing more or less red scales, at any rate in the first one from the costa, indeed it is rather rare than otherwise to find a ♀ entirely without it, it is less frequent in ♂s and less conspicuous. It would be well here to mention that throughout this paper, the statistics I give are, unless notified as otherwise, from a series of forty specimens in my own cabinet, twenty males and twenty females, they were selected somewhat promiscuously from a number of others, several years prior to my taking an interest in the variation of the species, quite independently of the development of any particular marking with the exception of the "celldivided" varieties, and it is only a peculiar coincidence that they are equally divided between the two sexes; all are from Wicken Fen and all are bred with the exception of two "celldivided" ones. Of these forty specimens, the red appears in one or more lunules of 19 ♀s and 13 ♂s; it is most often in the first or costal lunule in which it is always conspicuously larger than in any of the others; in specimens in which it is present in more than one lunule it diminishes in size in each one from the costa, but there is more difference in size between the first and second than the second and third. The lunules which have it most rarely are the 4th and 5th, only two specimens have it in the 5th and three in the 4th, and these only to a very small extent: I have prepared the following table to show exactly how it is placed in the forty specimens. The top numbers represent the submarginal lunules, commencing from the costa of the wing—

Number of Specimens.	1	2	3	4	5	6	Number of Specimens.	1	2	3	4
FEMALES.							MALES.				
1	+	—					1				
2	○	—				—	2	—			
3	○	+	+	+	—	+	3	+	—		
4	—	—	—	—		—	4				
5	+	—					5	+			
6	○	—					6				
7	φ	○	—			—	7	—			
8	+	—				—	8	+			
9	—	—					9				
10							10				
11	φ	○	+	+	—	+	11				
12	○	—	—				12	+			
13	+	—				—	13	φ	—		
14	○	+	—			—	14	—			
15	φ	—					15	○	—		
16	+						16	φ	—		
17	+						17				
18	φ	+	—			—	18	+			
19	○	—	—			—	19	—			
20	—						20	—			

The marks used signify—φ a very large patch of red; ○ a small sized patch; + a small patch; — very little to be seen; . mark = no red.

From this it will be seen that out of 20 ♀s only one is without red in all the lunules; two have it in all six; one in five (without it being the fifth); four have it in four, in each of two lunules without it being the fourth and fifth; four have it in three of which have it in the first, second, and sixth, and one in the second, and third; four have it in two, viz. the first and second, and one in only one lunule, viz., the first—in other words 19 ♀s have red in the first lunule; 15 have it in the second, 8 in the third, the fourth, 2 in the fifth; and 10 in the sixth. Out of 20 ♂s entirely without red in all the lunules; 2 have it in three, viz. second, and sixth; 3 have it in two, of which two have it in the first and second, and 1 in the first and sixth, and 8 have it in only one of the first; in other words, 13 ♂s have red in the first lunule, 4 in the second, 3 in the sixth, and none in either the third, fourth, or fifth. It will also be seen that not only is the red much rarer in ♂s, but where it does occur it is less noticeable.

A most interesting paper by Mr. J. Jenner Weir, entitled "The significance of occasional, and apparently unimportant markings in Lepidoptera," appeared in *The Entomologist*, xxiv., p. 105, in which he advances a theory based on the occasional development of red sub-marginal lunules of the posterior wings of *P. machaon* and other allied species of *Papilio*, that this red marking is the evanescent of a costal ocellus in the ancestral form, from which *P. machaon* and other allied species have descended; in support of which the

cites several species as having red in the costal lunule, and adds, "It often happens that the second lunule has a trace of the reddish or orange colour, this may be occasionally found in *Papilio machaon*." The species he cites as having red in the upper lunule or lunules "belong to at least three different but more or less allied genera," and "in all the species dealt with there is at the anal angle of the hind wings, a more or less distinct ocellus with a red pupil or patch: this is very well marked in *Papilio machaon*." Mr. Jenner Weir then goes on to say: "Arguing from *a priori* considerations, one would be inclined to consider that the reddish or orange suffusion in question was the nearly obsolete trace of an ocellus which had once existed in the ancestors of these butterflies. The question then arises as to whether any facts can be adduced in support of such an hypothesis. Africa is a continent which has not undergone those stupendous geological changes which have affected so profoundly the palaearctic and nearctic regions, from which my illustrations have been drawn, and in which, therefrom, some archaic forms of *Papilioninae* might be expected to be found. *Orpheides demoleus* is a well-known and very common African butterfly, which has an ocellus both on the costa and on the anal angle of the lower wings; but it is only the lower ocellus that has much red around the pupil; still, I have a specimen with the costal ocellus well marked with red, exactly in the same part of the wing in which a similar orange spot is found in *Euphaeades troilus*, and, in all cases, the dark centre of the pupil is suffused with red. In the very closely allied Indian species, *Orpheides erithonius*, I cannot detect any red around the upper ocellus; the lower has a large patch of that colour, but, regarded as an ocellus, it is indistinct, especially in the males; indeed, in both these species the costal ocellus is much better defined than that at the anal angle. Both are without tails, and it would seem that the development of the tails in *Papilio*, *Jasoniades* and *Euphaeades*, destroyed the original bilateral symmetry of the under wings, and reduced the costal ocellus to a mere vestige; and in *Iphiclides*, where the tails are more developed, even the slight vestige has disappeared. The shape of the wing in this last mentioned genus is quite different from that of *Papilio*; the length of the tails seems to have been effected at the expense of the breadth of the wing; indeed, in this respect *Iphiclides* approaches more nearly to the contour of the wing of *Leptocircus*. A similar remark applies to the Indian genus of Swallow-tails, *Pathisa*; in *P. agetes* there are red spots above an obsolete ocellus in the anal angle of the wing, but no red at the upper angle; in some of the other species even the red at the anal angle has faded into yellow, *e.g.* *P. paphus* and *P. glycerion*, and in *P. antiphates* the yellow above the pseudo ocellus has disappeared. There is another genus of African *Papilioninae* possessing large tails, and in the male sex, on the upper wings, there are androconia on the sub-median nervure and median nervules clothed with short, cotton-like scales. I do not think this genus has been named, but it appropriately might be called *Erioptera*. In *E. ophidicephalus*, although a tailed species, the upper ocellus is developed in the lower wing; but it may be added that, in this species, the ocellus at the anal angle is very largely developed, and that there are indications of a second one above the third sub-median nervule. In the very closely allied species *E. menestheus*, the upper ocellus is absent, and in its place there is a costal red spot, exactly in the same position as the

orange spot in *Euphœides troilus*, above adverted to. In *E. constantinus* there is no trace of red in the upper lunules of the under wings. The possession of a costal ocellus is very rare in the *Papilioninæ*. In Dr. Staudinger's "Exotische Schmetterlinge," where nearly a hundred species of this sub-family are figured, the only one delineated with the ocellus in question is *Orpheides demoleus*, which, as before stated, is, in my opinion, an archaic form, the larva of which has considerable resemblance to that of *Jasoniades glaucus*. I am therefore of opinion that the insignificant red suffusion on the first lunule of *Papilio machaon* is the evanescent vestige of an ocellus, in the ancestral form from which this and several other allied species of *Papilioninæ* have descended; and, as such, is not without its value as a contribution towards the philogeny of the genera above dealt with. I am the more inclined to this view because I find this vestigial marking more often to be found in the females of a species than in the males; the former being, as very well put by Professor Westwood, the more conservative sex."

In the same volume of *The Entomologist*, page 130, Mr. E. A. Bowles, commenting on Mr. Jenner Weir's article says:—"I think he rather underrates the extent of the red suffusion on the upper side of the lower wing of *P. machaon*, when he says the second submarginal lunule of the lower wing is "occasionally found" to have a trace of the reddish colour. In eighteen specimens I examined, I find four males and one female with red in the first and second submarginal lunules of the lower wing; one female with red in the first, second, and third lunules; one female with red in the first, second, third, and fourth; and in one female in the first and sixth lunules, the sixth being the lunule immediately before the ocellus at the anal angle. Five males with red in the first lunule only; two males with the red entirely absent in all the lunules, and three with so small a number of red scales in the first lunule, that they are scarcely noticeable without a magnifying glass. Thus it is possible to have the red suffusion in the first four and the sixth lunules. I regret to say I have not Mr. Jenner Weir's vast acquaintance with foreign allied species, but having noticed what, I think, is a marked connection with the above conclusion, in a species which I find unnoticed by him (unless I have it wrongly named), I add as my one ewe lamb of further evidence in support of the theory of vanished ocelli. I possess a butterfly named as *Papilio phorcas*, and said to be African, which has an irregular ocellus on the costal angle of the lower wing, the iris of which is blue, much suffused with red; then follow three lunules of red, corresponding in position with the second, third, and fourth submarginal lunules of *P. machaon*, and there is another red lunule next to the very distinct ocellus at the anal angle. Thus in both species, red is found in all the lunules excepting the fifth. May it not be possible that their common ancestor possessed six perfect ocelli?"

As I have shown, I can add to this, that it is possible to find a slight trace—at any rate—of the red in all six lunules of *P. machaon*, including the fifth. Like Mr. Bowles, I have no acquaintance with the foreign allied species showing costal ocelli, which form the real support of Mr. Weir's theory; the only one I have seen being *Orpheides erithonius* in Mr. Bryan's collection; this has a costal ocellus, but as Mr. Weir remarks, without any trace of red around it; the submarginal band which is entire in *P. machaon*, is much broken up in *O. erithonius*,

and one might almost consider the costal ocellus in the latter, the remaining one of a series of ocelli which had existed, one between each nervure. But to return to *P. machaon* and leaving the submarginal lunules, I would refer to the development of red in another part of the hind wings, which seems to me a piece of evidence (quite independent of Mr. Weir's theory) that red is rather in course of evolution, than vestigial in the posterior wings of *P. machaon*.*

Most lepidopterists are no doubt aware of the existence of two elongated patches of red on the underside of the hind wings, situated between the inner edge of the submarginal band and the discoidal cell. one between nervures 3 and 4, the other between 4 and 5; on the examination of a number of specimens, it will be found that there is very often a small patch between nervures 5 and 6, and sometimes, although rarely, a slight indication of it is to be seen between all the nervures; taking into consideration a rule *almost* without exception, that whenever there are red scales on the upper surface of the wings, there is a *greater* quantity on the *underside*, and even in some cases where there is no, or hardly any, discernible red on the upper surface, there is on the underside quite a fair-sized patch or patches; one might reasonably expect to find cases of the occurrence of red scales inside the submarginal band, corresponding to the before-mentioned red on the underside. Six or seven years ago, I heard an account from one of the Wicken collectors of the breeding or capture—I forget which—of a specimen of *P. machaon*, having "the hind wings considerably flushed with red." I am sorry to say I did not see the specimen, but judging from the sum, it was sold for, *viz.* £1 (I believe this is correct) it must have been something very much out of the ordinary. Since this, I have always been on the look-out for specimens with red in the yellow space inside the submarginal band, with the result that I am this evening able to show seven specimens, all having more or less of the red; for the loan of one of these, *viz.*, the one having most red, I am indebted to Mr. Bloomfield of London, who bred it from a Wicken pupa last season. It has on the underside of the hind wings, the usual amount of red between nervures 3—4 and 4—5, a smaller amount between 1—2, 2—3 and 5—6, and also, but in a much less degree, between 6—7, and just two or three specks between nervures 7—8; on the upperside, it has red scales between nervures 1—2, 2—3, 3—4, and a slight indication between 4—5 and 5—6; the greatest amount is between nervures 1—2; one specimen is from Mr. Jones's collection; the remaining five I picked from a number of Wicken specimens. There is generally most red between nervures 1—2, and it is also well shown between 3—4 and 4—5; one would at first expect the greater amount of red to be between nervures 3—4 and 4—5, seeing that it is here that the two normal patches are placed, the comparatively small amount shown on the upper surface, however, is easily accounted for, as from nervure 3 to 5 the submarginal band on the upper surface extends considerably nearer to the discoidal cell than on the underside, so that the greater

*I am delighted with this independent expression of the view I have previously taken of the subject. My contention (*Secondary Sexual Characters*, p. xvii) that the female is usually the variable and not the conservative sex receives direct confirmation from the data given by Mr. Farren's paper and his argument strengthens remarkably my criticism of Darwin's theory (*l.c.*, p. p. xvi-xviii).—J. W. TURR.

part of the two red patches on the underside is opposite the upper surface-submarginal band, and it is only the *tips* of the red markings which occasionally are reproduced in the yellow area of the upper surface. The submarginal band on the underside is in no part—except perhaps the portion between nervures 7 and 8—so broad as on the upper surface, but the difference is slight except between nervures 3 and 5. It is particularly important to remark that all the seven specimens I have seen with red inside the submarginal band are females. How far this development of red bears on Mr. Weir's theory, it is hard to say; it may strengthen it; it certainly shows a very strong inherent tendency on the part of *P. machaon*, to develop red scales in the hind wings, and is a point well worthy of further consideration.

The remaining points of variation in the posterior wings are chiefly of shape of the markings, and are in a great measure dependent on the size and development of the specimen; I will refer first to the broad sub-marginal band which varies considerably in width; in a typical specimen it is broadest from nervure 2 to 4, it then narrows towards the costa, its inner edge being about parallel with the hind margin of the wing; in some specimens the band is of equal width up to nervure 6, the gain from nervure 4 to 6 being almost entirely on the inside, this converts the inner edge from a curved line to almost a straight one, and considerably lessens the width between it and the discoidal cell, and in some specimens I have, the band reaches and partly encloses the black patch on the discoidal lunule. The band is densely clothed with metallic blue scales, but has a well maintained border of black on both edges, the outer one being least clearly defined, and in one or two specimens the blue scales almost reach to the extreme edge of the band: the blue scales are usually divided up into six patches by the lines of the nervures, but in one or two specimens they cover the nervures as well, and so become a continuous mass.

The remaining important feature in the variation of the hind wings is in the black patch on the discoidal lunule, this varies much in size and shape; one specimen in my own series is entirely without it, others have it very small, and intermediate forms occur to a patch about 3 lines by 1 line in size; a form not uncommonly occurs generally known as the "cell-divided variety," in which this black patch is divided in the centre by a thin yellow streak, this variety I have found more frequently in ♂s than ♀s, it is so in my series in the proportion of nine to two. I think this is very likely only accidental, as two or three in Mr. Jones' collection are all ♀s. The nervures of the posterior wings are usually but thinly coated with dark scales, but there is occasionally a thickening, especially of the boundaries of the discoidal cell. The submarginal yellow lunules vary in shape and size, usually subordinate to the size of the specimen; in a very few specimens they are inclined to be squarish patches slightly concave on the top, and entirely losing their lunar shape, in others they are perfect lunules, but generally the lower end is a little the longer, vanishing in a very fine point. The "tail" varies in length, but this also depends in a great measure on the size of the specimen.

In the upper wings the first point to claim my attention is the occasional possession of a black spot near the apex of the wing, in the yellow space between nervures 6 and 7. There is always a black spot *in the space above*, which I will allude to as the subapical, and the

occasional one beneath as the second subapical spot. This latter seems to be slightly more common in ♂s than ♀s; in my forty specimens I find it in 11 ♂s and 9 ♀s, of the 11 ♂s 8 have it from large to medium, and 3 have it from medium to very small; and of the 9 ♀s, 4 have it from large to medium, and 5 from medium to very small. Although it is not uncommon, especially in females, it is by no means the rule for *machaon* to have a black spot on the underside of the wing corresponding to the subapical spot on the upperside, but in no case have I detected the slightest trace of one corresponding to the second subapical spot. Occasionally the subapical spot has a slight sprinkling of yellow scales in the centre, in the same manner in which the basal patch and submarginal band are marked; in one, and only one specimen have I found the subapical spot on the underside similarly speckled, the second subapical spot to my experience never has yellow scales. The eight submarginal yellow spots vary in a peculiar manner; the first one from the anal angle is much the largest, and is oblong in shape; the next three or four are somewhat lunar or semicircular, which shape is gradually lost, and the size of the spots diminished to the seventh one, the last three being nearly round, the last or apical one is round and larger than those immediately preceding it, leaving out the anal spot, which is always the largest; the above order is in some few specimens reversed, the spots getting gradually larger from the second to the apex, and sometimes, but more rarely, the apical yellow spot is the smallest of the eight instead of largest but one.

The larger black patch, slightly beyond the centre of the discoidal cell, reaching the boundaries on either side, and which I will allude to as the "costal bar," is usually of equal width throughout, but varying in width in different specimens, in a very few cases it is slightly wedge-shaped, widest near the costa; there is rather a general tendency to have a slight indentation on the outer edges; in one specimen I have, this is strongly developed, and there is from the centre of the discoidal lunules a short black streak following the direction of the indentation in the "costal bar," besides this there is in this specimen an additional marking, a black spot in the yellow space between the basal patch and "costal bar;" I find in several other specimens a slight indication of this spot; in another specimen the indentation in the "costal bar" is still more strongly developed, but in one wing only, the "costal bar" is much contorted, the inner edge projects in a point towards and almost unites with a black streak which projects from the basal patch, whilst from the middle of the discoidal lunules extends another black streak, towards and just entering a large gap in the outer edge of the "costal bar."

The black patch at the end of the discoidal cell sometimes contains a thin yellow longitudinal streak, and I find this is nearly always so in specimens which have the corresponding peculiarity in the hind wings; out of nine specimens with the so-called "cell-divided" variation in the posterior wing, seven have it also in the anterior wings; and out of a series of 40 specimens, only two are "cell divided" in the anterior, and not in the posterior wings. The remaining point in the anterior wings, but not by any means least important, is a not uncommon tendency on the part of nervure 4 to be longer in comparison than the rest of the nervures; so much so in some specimens, as to form a projection on the hind margin of the wing, and this is rendered

somewhat significant when we come to consider that this nervure corresponds exactly with the one which forms the tail in the posterior wing. I do not think besides this that there is any important variation in the neururation of *P. machaon*. I have one specimen in which nervures 3 and 4 of the posterior wings are united from the discoidal cell to the commencement of the sub-marginal band, so that there only appear to be three nervures instead of four proceeding from the black patch on the discoidal lunule, which causes more strangeness of appearance than might be imagined; another specimen is entirely without nervure 3 in all the wings; this causes a considerable narrowing of the wings, and consequent absence of one sub-marginal yellow spot or lunule in each wing, and on the underside of the posterior wings the loss of the first of the two large red patches; both right and left sides are exactly alike, the symmetry being as perfect as in a normal specimen.

In conclusion, I would remark that although my statistics, especially referring to the development of red in the posterior wings, may be taken as fairly applicable to British specimens, they would, probably, not hold good with specimens from other parts of the world; some from the South of France, Italy, and Germany, in Mr. Bryan's collection, are much paler than British specimens, the black bands are narrower, and the yellow—which consequently occupies a greater proportion of the wings—is clearer, and there is considerably less red in the sub-marginal lunules; it will be seen that this latter agrees with Mr. Weir's remarks in *Entomologist*, xxiv., p. 105. In this same volume of *The Entomologist*, p. 82, Mr. South writes in an article, "On Certain British Lepidoptera occurring in Eastern Asia":—" *Papilio machaon*, Linn.—Mr. Elwes says:—'The forms of *P. machaon* found in N.E. Asia seem to be similar to the European ones, though usually larger. In Kamtschatka, according to Ménétrés, the variety which he calls *asiatica* . . . differs generally in the broader black band and markings, which, however, vary extremely, and gradually increase until in the var. *hippocrates* (which I have only seen from China and Japan) the yellow is half obliterated by the black markings. . . . From ova deposited by a typical female captured at Nagasaki, Japan, in May, Mr. Leech bred in the following June a fine series of vars. *asiatica* and *hippocrates*, some specimens had the usual proportion of black and yellow, others were of a much deeper yellow than the ordinary type, and some were nearly all black, being by far the most pronounced var. *hippocrates* I have yet seen. Every specimen was much larger than the parent.' " To this I may add that, I have seen in Mr. Leech's collection a specimen entirely black. *Papilio machaon* used to be by no means the exclusive Fen species it has become of late years in this country; and this isolation, no doubt, has much to do with the extreme development of such a marking as the red patches in the posterior wings; and, as humidity is considered an important factor in the production of melanic forms, may not their restriction to a Fen habitat in England have much to do with the increased size of the black markings?—W. FARREN, Fern House, Union Road, Cambridge.

MELANOCHROISM NEAR LONDON.—As variation near London has a tendency to melanism, a list of the melanic vars. should prove interesting. Will other entomologists supplement the following list?

Stauropus fagi, legs, abdomen, fore and hind wings, ground colour very like that of *A. betularia* var. *doubledayaria*, with scarcely any markings, sometimes at intervals dashed with a fine white; taken occasionally in Epping Forest. *Cuspidia psi* var. *suffusa*, common all over the district. *Bryophila perla*, forewings a mass of black scales, slightly relieved with light, and a light band near thorax; common, London. *Xylophasia rurea*, fore wings almost unicolorous dark reddish-brown, discoidal, lighter; not scarce, Epping Forest. *Apamea didyma*, fore wings, black, discoidal spot, white; hind wings, dark; occurs plentifully. *Miana strigilis* vars. *latruncula*, *æthiops*, more common than type. *Miselia oxyacanthæ*, fore wings, black; hind wings, dark; common near London. *Hemerophila abruptaria*, fore and hind wings almost unicolorous deep brown; occasionally, London. *Boarmia repandata*, ground colour very deep blackish; markings distinct; not common, London. *Hybernia leucophaæaria*, fore and hind wings, unicolorous black; occasionally. *H. marginaria*, fore and hind wings brown; not common ♂. ♀ Abdomen, black; fore and hind wings unicolorous black, except at edges; occasionally. *Eupithecia rectangulata*, fore and hind wings, and abdomen, black; sometimes with beautiful green lines; common, London.—AMBROSE QUAIL, 15, Stamford Hill, N.—[We believe that the whole of these varieties have names and are on record from the London district. To us, our correspondent's comparison of the dark var. of *Stauropus fagi* with *Amphidasys betularia* var. *doubledayaria* does not appear happy, as the ground colour of the former bears no resemblance to that of the latter; whilst the remark, "with scarcely any markings," is scarcely correct; as we have seen a fair number of this variety, all having very distinct markings. The others all appear to refer to well-known and named varieties. We take it that our correspondent refers especially to London north of the Thames, in these notes, and North London in particular; and from that point of view it would be interesting to compare with the list in *The Entomologist*, vol. xxi., pp. 247-249.—ED.]

VARIATION IN THE FEN DISTRICT.—A record (*ante*, Vol. i., page 13,) on *Miana strigilis* vars. &c. has induced me to put on record from the Fen district, Upware, Cambs., that the very pretty var. *cerata*, Esp. and var. *latruncula*, Haw., both occurred in July, 1891, and at the same time I took a melanic *Agrotis exclamatoria*, and comparing this with *strigilis*, it seems interesting, as I have never taken the melanic form (*æthiops*, Haw.) of *strigilis* in the Fen district.—A. QUAIL, 15, Stamford Hill, N.

THE RELATIVE FADING OF TINT FROM EXPOSURE.—I was interested to see Mr. Prideaux's remarks (*Record*, iv., p. 5) as to the "Relative fading of tints" in Lepidoptera by exposure, and should be glad to know if other entomologists have noticed the same tendency. I have noticed in *Nemoria viridata* the extreme paleness of the upper wings in many specimens, which have been flying at the same time as others, with the upper wings of the normal beautiful green colour, and have been puzzled to account for the fact. Possibly, the paler specimens had been on the wing longer than the normal-coloured ones. Perhaps some correspondent can inform us whether specimens of this or other species, with this apparent tendency to fade in life, have been bred with such pale upper wings.—(REV.) J. A. MACKONCHIE, The Hirsell, Coldstream, N.B. January, 1893.

LIPARIS MONACHA VAR. EREMITA.—In spite of the startling revelations about the dark race of *L. monacha* recently figured in the *Ent. Record*, I think that Mr. Tutt's statement in vol. iii., p. 305, is too sweeping. His words, as they stand, seem to imply that all the dark races of *monacha* now being reared in Britain, have a Continental origin; but such is not the case as the following facts will show. Starting with eggs laid by a typical wild ♀, caught in the New Forest, in 1887, Mr. W. H. B. Fletcher of Worthing, has, by a process of careful selection from the progeny of this single wild moth, bred some very handsome and extremely dark forms, and as the race becomes darker each year, it is most probable that some of the next generation will be perfectly black. [*Vide, ante*, p. 21.—Ed.]. I may also mention, that Mr. C. Gulliver, of Brockenhurst, was fortunate enough to take an exceedingly dark ♂ specimen—as dark, I should say, as the one shewn in fig. 5, on the Plate in the *Record*—in the New Forest last year (1892), so there can be no doubt that, in that locality at any rate, *L. monacha* shews an inherent tendency towards blackness, although the very dark forms are but rarely met with in nature.—EUSTACE R. BANKES, The Rectory, Corfe Castle. *January*, 1893.

MELANISM IN YORKSHIRE LEPIDOPTERA.—In the last No. of the *Ent. Record*, pp. 88–90, is part of a paper I read at the South London Ent. Society's Meeting of Feb. 9th. I was unable to send the remainder in time for publication last month, but do so now. It is as follows:—“*Larentia didymata*.—Melanism in *didymata* has often been recorded of the male, but collectors generally do not seem to be aware that it exists to a marked degree in the case of the females. My series is composed of specimens from all over Yorkshire, and includes an almost white form from limestone districts, as well as dark varieties from Horsforth, which approach in depth of colouring to the pale males from chalk districts in Kent and Surrey. *Hypsipetes sordidata* = *elutata*, *Hb.*—This polymorphic species is very abundant on the Yorkshire moors, the black form being as common as that marked with green. *Melanippe bicolorata*.—This insect is decidedly darker than southern examples. I have seen some very pretty varieties in the York collections. *M. ocellata*.—The transverse bar in this species is a deeper purple than in specimens from the southern woods. *M. galiata*.—Four examples given to me by Mr. Porritt represent the Huddersfield form: the transverse bar, and, in fact, all the markings are much darker than in the southern examples which I possess. *Melanippe fluctuata*.—The usual range of variation is found in the Horsforth district, but on their first emergence in spring very dark specimens are taken; these, however, are not common. *Diurnæa fagella*.—This is a species very prone to melanism, black forms being found near every large town, but especially is this the case in the North. At Leeds 50 per cent. are black, about 47 per cent. smoky, while only 2 to 3 per cent. are of the typical form. As one goes away from the smoke the percentage of black forms decreases, while the percentage of the type increases in the same proportion.

In my preliminary remarks I described the artificial condition of the environment in the Leeds district. It will be seen that the most prominent feature is the extraordinary amount of smoke turned out by the various factories which crowd the district, this leading to a permanent darkening of the trees, etc., which darkening is, to some extent,

increased by the high rainfall. Probably there is no other district in England where the same conditions obtain to the same extent as in the West Riding. Now it is a positive fact that as one goes out from Leeds, in any direction where there is less smoke, that the percentage of melanic varieties becomes less, and that the farther one goes the lower is the proportion of varieties met with. This does not obtain in all species, as for example, *T. biundularia*, *E. viminalis*, etc., but even in such species as these the melanic specimens from the West Riding are usually darker than those from smokeless districts. This is especially noticeable in *D. fagella*, probably because this insect is more susceptible to changed conditions of life* than almost any other of our English moths. Going out from Leeds I have found the percentage gradually decrease, until, in a wood, fifteen miles away it was the exception to find a smoky variety while in Wharfedale. *A. rumicis*, so far as my experience goes, is always typical. The conditions of Airedale and Wharfedale in the district of Leeds are precisely similar, except that there is no smoke in Wharfedale. One cannot help being struck by these facts, and without wishing to give undue emphasis to this statement, from actual study of the environment and climate on the spot, I am forced to the conclusion that smoke is the chief factor in the production of melanism in the West Riding of Yorkshire.”—WILLIAM MANSBRIDGE.

Mr. Mansbridge's conclusion is that to which I have already come in these pages. In Vol. i., p 56, I write, after quoting a great many examples:—"I believe from this (and it appears to be a fair deduction), that Lancashire and Yorkshire melanism is the result of the combined action of the 'smoke' plus humidity, and that the intensity of Yorkshire and Lancashire melanism produced by humidity and smoke is intensified by 'natural selection' and 'hereditary tendency.'" Of course I use the word "produced" here in a broad sense, without going deeper into the vital and more complex physiological processes which must be at work, and accompany such change. The action of "smoke" is probably more specially indirect, and only acts so far, that it helps the rain to permanently darken objects within its area of influence, and hence re-acts by "natural selection," most particularly on those species which rest on fences, trees, and other objects thus made permanently dark by its aid. The intensification of the darkening is brought about by "natural selection," which weeds out the pale-coloured examples under these conditions by their conspicuousness. A further discussion of Yorkshire and Lancashire melanism is to be found *Ent. Rec.*, Vol. i, pp. 86-87.—J. W. TUTT.

MELANIC VARIETY OF *HYBERNIA AURANTIARIA*.—A few weeks ago, thanks to a hint from Mr. Dennis, of the South London Society, I found that a dark unicolorous variety, of what had been in my cabinet under the name of *H. defoliaria*, was really *aurantiaria*. The specimen was taken at light at Horsforth, near Leeds, in September, 1890. The true name of the specimen was determined by a comparison of the antennæ,

* Query. Is it not rather that, being a common species, and of the prevailing black and white (or grey) tint, which lends itself most readily to modification, as well as an inhabitant of the suburbs of our large towns, and hence, directly, under the darkening influence of smoke, that "natural selection" is able to produce such marked response to environment in this species, rather than any special inherent susceptibility in the organisation of the species?—ED.

these organs being distinctly different in form in the two species. The variety is parallel to the *var. fuscata* of *H. marginaria*, but is not quite so dark.—W. MANSBRIDGE, 21, Rosenau Crescent, Battersea, S.W.

DARK VARIETY OF *PHIGALIA PILOSARIA*.—I took on March 12th a beautiful melanic variety of *Phigalia pilosaria* in the woods here. It is a very dark green (almost black), with black nervures. I have never seen anything like it before.—R. B. ROBERTSON, Sketty Park, Swansea.

CURRENT NOTES.

We do not wish here to enter into any discussion *re* nomenclature, but would point out that in Mr. Dale's notes of last month, *British Naturalist*, vol. iii., pp. 50-53, there are two or three facts that want setting straight.—1. Mr. Dale rightly speaks out against the descriptions of Hufnagel as being poor compared with what are expected now-a-days, but he loses sight of the fact that within ten years of publication, Hufnagel's friend, Von Rottemburg, extended these short diagnoses, and set Hufnagel's nomenclature (by the excellence of his descriptions) on a sounder basis than that of any other author of the time. There can be no doubt of Hufnagel's synonymy read with Von Rottemburg's work thereon. (2) Mr. Dale's description of Fabricius' *cytherea* is altogether unintelligible, and, of course, as written, will strike any entomologist as ridiculous. Whatever do the following phrases mean: "margius fresco," "cinerco frescogue," "fleuræ margius fresco," "subtutus anticæ"? It is, of course, Mr. Dale's aim to make these old authors look ridiculous. To do it by quoting barbarities like these, which do not exist in their works, is utterly reprehensible, and out of keeping with scientific work. (3) Mr. Dale's quotation from Staudinger with regard to *sinon* is altogether out of date. Staudinger corrected it himself 21 years ago, and it has been corrected by wiseacres, who have not looked at Staudinger's *Corrigenda*, a dozen times since. (4) On p. 53, what does "Affinis nimeium Hyales" mean? (5) Concerning the non-occurrence of *Colias hyale* in Scandinavia, perhaps Mr. Dale would do well to look up Sven Lampa's excellent list in *The Entomologisk Tidskrift*, 1885. Truly Mr. Dale's paper is fearfully and wonderfully written, and proves conclusively the old adage, "a little knowledge is a dangerous thing."

A most interesting paper of *Coccidæ* and the ants with which they are associated, together with the description (and fig.) of a new species *Ripersia subterranea*, obtained on roots of *Nardus stricta* in nests of *Formica flava*, on a raised shingle beach at Ingoldisthorpe, near King's Lynn, Norfolk, on August 20th, 1892, is communicated by Mr. R. Newstead to the current number of the *Ent. Mo. Mag.*

Mr. W. H. B. Fletcher records the capture of *Grapholitha gemmiferana* in Hampshire. On May 27th and June 2nd, 1890, several males and a few females were taken among plants belonging to the Nat. Order *Leguminosæ* occurring in the locality. It is "like *G. cæcana*, but with more ample wings, with the geminated markings on the costa well developed, from one of which a lustrous leaden line passes to anal angle, bounding the ocelloid patch found there on its inner side, and meeting beneath it a second line (broken in the middle) which borders the outer

edge of the patch," etc. The same lepidopterist has also found larvæ of *Pancalia leuwenhoeckella* feeding in the petioles of the leaves of *Viola hirta*.

Mr. Bankes questions the right of *Butalis dissimilella*, H.-S., to be considered British, and states that an odd undetermined specimen of *Butalis* was recorded by Mr. Meyrick, from Newbury, in the *Ent. Mo. Mag.* of 1875 as possibly *dissimilella*. Then in the Index of Vol. xiv. of that Magazine, *dissimilella* appeared without a query; hence its present inclusion in some of our Exchange lists. As it is not included in any text-book on British entomology, and only appears in dealers' *Exchange Lists*, we fail to see that there is yet much cause for alarm, or that the slip in the Index of the *Ent. Mo. Mag.* adds it to the British fauna, nor do we suppose that anyone who collects Micro-lepidoptera scientifically, supposes that it is a British insect. It is well, though, that Mr. Bankes has pointed this out to our *Exchange List* makers.

PRACTICAL HINTS.

THE BREEDING OF BOMBYX RUBI AND SPILOSOMA FULIGINOSA.—During September last I noticed a number of fine and apparently full-fed larvæ of *Bombyx rubi* lying about on the heather at Windermere, so I determined to make another attempt at breeding them, having previously always failed. I am happy to say that this time my efforts have proved more successful. I will simply lay before you an account of my experiments with this caterpillar, and also with that of *Spilosoma fuliginosa*, a number of which I also found. My idea was to keep the larvæ out of doors, and exposed as much as possible to the elements of autumn and winter, till they had been well frozen, and then to bring them into sudden warmth. I accordingly planted a cucumber frame with large sods of living heather and grass combined, into which I placed rather more than 150 larvæ of *B. rubi* and about 30 *Spilosoma fuliginosa*. I had two large pieces of glass taken out of the middle of the frame and replaced by perforated zinc, so as to keep the temperature inside the frame as nearly as possible uniform with that outside, and also in this one place to let in the rain. The larvæ spread all over their enclosure, and fed up well to the end of the month, when I was obliged to go away from home, and leave them to the tender mercies of the gardener. I returned to Windermere about December 10th. The snow, which had been lying for some time, owing to the frost, was just beginning to thaw. On looking into my cucumber frame, I found a good deal of the heather dead, but still plenty of fresh, green shoots; there were also some eight or ten dead "fox" caterpillars lying on the surface, but I concluded that they had not been dead long as there was no mould about. I carefully tore to bits a small piece of one of the sods, and found three *rubi* and two *fuliginosa* snugly curled up like dornice: these I took and placed in a box containing some damp moss, and resting on the green-house pipes. I fastened to the lid of the box a small Fahrenheit thermometer, which registered pretty constantly between 80° and 90°. A few moments after being subjected to this temperature, the larvæ were walking about the box in a most lively manner. In four days two of the *rubi* began to spin, and assumed the pupal stage on the seventh, but the third, which did not appear so healthy a caterpillar,

shrivelled up and died shortly afterwards. The *fuliginosa* both spun up, after waiting for a week or more to see if spring had really come. Of the two *rubi* which pupated, the smaller, which turned out to be a male, emerged under ten days from becoming a pupa; the larger one produced a fine female about three days later, so that the transformation from the hibernating larvæ to the perfect insect took only three weeks in the case of the female, and even a shorter time with the male. The *fuliginosa* also took but three weeks or a little longer, perhaps, to complete their life history. These, with the female *rubi*, were of normal size and colouring, but the male was rather small and light. I was much delighted with my success, and repeated my experiments with ten or a dozen larvæ, and with much the same result. From the Monday in Christmas week till the time that I left home again—about January 19th—we had an almost continuous frost, and sometimes very severe, the thermometer once registering only five degrees above zero in our garden. I purposely left the rest of my larvæ exposed for a fortnight to this severe weather, till the sods and the soil below were frozen as hard as bricks for several inches. I then carried several of the sods bodily into the greenhouse to tear up, and turned out many fat caterpillars covered with hoar frost, some of which I had to be very careful not to damage, as they were very securely frozen into the soil. As it was, one specimen of *fuliginosa* left all the hair of one side behind, but in the end it seemed to be no worse, and arrived at the moth stage in due course. One peculiar incident I should like to mention with regard to the way in which the frost had affected some of the “foxes.” In searching, I picked out one or two which were stretched out and apparently dead. I took one and tried to break it in two, but although it cracked inside as though it were full of frozen snow, the skin was tough and would not break. I then, with the idea of melting the inside, and never for one moment dreaming that there was any life left in the larva, laid it on one of the hot pipes. Shortly afterwards I saw it moving. I hurriedly took it off, and although it continued alive for some time, the trial had been too severe for it. The others that were in the same crystallized condition I placed in the box of warm moss, and they recovered quite satisfactorily, like their curled-up companions. Why some and not others should have assumed this curious state is more than I can understand, but I think that few people would have hesitated in saying that these stiffened forms were dead. Following the same plan as heretofore, I succeeded in getting more than fifty into pupæ, a few only dying. The rest of the larvæ I have still left in the cucumber frame, to see if they will naturally turn later in the spring. Those which I got to the pupa state varied considerably in size, and, on the whole, were smaller than usual. About twenty emerged while I was at home; the rest, which I was stupid enough to take out of their warm climate, and bring back to Cambridge, all died except two. The *fuliginosa* were not affected in the same way, and all came out, although I had no means of keeping them in a warmer temperature than my room. A curious point as to the sex of *rubi*, is that by far the greater number of pupæ produced females, which I have always regarded as the rarer of the two. Most of the specimens are certainly under the normal size and of lighter colouring. It will be seen, then, by the foregoing, that I have subjected these two regularly hibernating larvæ to severe tests. They have been taken in the frozen state at about 22° Fahrenheit, or less, and suddenly raised to

more than 80°. The sudden change to the warmth seemed to enliven their movements in every stage; the larvæ walked about rather faster than usual, and nearly all the pupæ wriggled out of their long cocoons as soon as they had turned, and it is, perhaps, needless to say that the male imago would not wait long to be looked at. I have thus simply stated the bare result of my experiments without comment as to the advisability of following my plan, because, although it is clear that by these means the "fox moth" may be reared from the caterpillar—and I believe that this is due, in a great measure, to their being well frozen—yet I think that the disadvantages of size and colour, which, I suppose, are the direct result of forcing, cannot be overlooked.—A. M. Moss, Trinity College, Cambridge. *March 6th, 1893.*

THE MONTH.—During this month, night searching for larvæ will well repay the labour. Large numbers may be taken, and nearly all the genus *Noctua*. Immediately after dark, examine—by the aid of the lantern—edges of ridings, and, in fact, everywhere where the warm dews of spring burst the bud, exposing to the hungry larva the succulent leaf. Success will be sure to follow. Captures will be numerous, and it will almost be impossible to separate each species, but when practicable, it would be well to separate as much as possible, so that notes may be made as to habits, &c.

The lengthening days continue to increase the roll of insects on the wing. Several of the butterflies are putting in an appearance *e.g.* *Leucophasia sinapis*, *Euchloë cardamines*, *Pieris rapæ*, *Lycena argiolus*, first brood.

Biston hirtaria, common in London squares on tree trunks; easily captured, being a very sluggish insect during the day. *Saturnia carpi* is a conspicuous insect, ♂ flying over heaths in the sunshine; ♀ seldom on the wing. Many good "Pugs" are out this month, such as *Eupithecia helveticata* and *E. coronata* (this family is worthy the attention of the young entomologist). Some "Thorns" also appear this month; in fact, the list of fresh imagines is more numerous than space will admit. Carefully date all captures for future reference, and when an "unknown" capture is made, label with date, &c., and put on one side until some "wiser" collector can affix the name.—J. P. Mutch.

NOTES ON BREEDING ENDROMIS VERSICOLOR.—Having had great pleasure and success in rearing this splendid insect, I hear, with regret, that some of my friends find it a difficult species to get into pupæ. I wish, therefore, to record my experience to the contrary. The first point is, to obtain ova of a healthy Scotch descent. The parent moths often pair more than once, with evident advantage to the fertility of the ova. These should hatch about the end of May, when birch leaves are in abundance, at least, in these southern parts. It is essential that the ova should be kept in the shade, and not exposed to the full rays of the sun until they begin to hatch. The omission of this precaution has often resulted in failure, and the blame has been laid on the ova. If sleeved on the growing tree, not exposed too much to the sun, they feed up readily, and eat enormously. I am sometimes obliged to finish them off on alder, but they do not seem to affect this, as they are said to do at Bannoch. The beauty of the full-grown larvæ is a real treat to the collector; and now for the pupation. Place the larvæ upon sandy earth, mixed with cocoa-nut fibre, and they will spin up readily, and keep safely. An additional ground for rearing *versicolor* is its early emer-

gence, when few other species claim our attention.—(REV.) B. SMITH, Marlow. April 3rd, 1893.

NOTES ON COLLECTING, Etc.

NOTES ON REARING AGROTIS SAUCIA.—As *A. saucia* is a somewhat variable species and very periodic in its appearance, I took the opportunity, when it turned up in some numbers last autumn, of obtaining a few batches of ova in order to be able to rear it. The species did not occur at Lewes in the great numbers that it appears to have done elsewhere, and, in fact, I did not see more than eight specimens on the best evening. I had however no difficulty in obtaining ova, as three females, which were taken, the first on the 27th September and the two others on the 29th September, laid freely in chip boxes in the course of the next few days. The batches of ova did not look very large, but I subsequently calculated that they must have laid over a thousand ova between them. I have reason to believe, as the specimens were worn and one only laid comparatively few ova, that this is only a fraction of the number that might be laid in a state of nature. Some of the ova of the first female were moved into a greenhouse, as they began to darken, and hatched on the 16th October, while those indoors of the same batch hatched on the 18th October. The rest of the ova hatched some days later, and a spell of cooler weather somewhat retarded them. Under ordinary conditions they probably hatch in a period varying from a fortnight to three weeks. Those larvæ which were kept in the greenhouse fed ravenously from the first, and showed no tendency to hibernate. They appeared to be polyphagous and very little came amiss to them, though dock, rape, cabbage and spinach formed the principal items of their dietary. The quite young larvæ seemed to feed at all times, but after the second moult they fed principally at night, and rested during the day on the underside of the leaves supplied to them. From the time when they were about half-grown until they pupated, they fed wholly at night, and buried themselves by day under the surface of the earth in the flower-pots, in which they were kept. The greenhouse in which the first batch, whose fortunes I am tracing were kept, had, during the month of October, a temperature ranging from about 65° by day to 50° or less at night, and was comparatively dry. On the 4th November however, the larvæ, being then about half-grown, were moved into a hothouse with a moist heat ranging between 70° by day to just below 60° at night. On mild damp nights the temperature probably never fell below 60°. The increased night temperature caused them to feed up very rapidly, and they went down between the 12th and 14th November. For those kept in this high temperature the pupal condition lasted less than three weeks, as the first imago appeared on the 1st December, followed by eleven on the 2nd, and others in rapid succession. Thus it is possible to rear the species from egg to imago in about two months. The rest of the larvæ were kept at lower temperatures, and were brought into the hothouse as they were required, so as not to have too many emerging at the same time. By this means, with a break (purposely arranged for Christmas), they have been emerging, more or less regularly, from the beginning of December to the present time (the end of February), while some are

still in the pupa state; in fact, I have a few quite small larvæ trying to hibernate in a cold room, but these do not appear to thrive, and probably most of them perish in our winters in a state of nature. It seems probable that *saucia* may have emigrated to our shores, along with *Colias edusa* and the other migrants who favoured us during the past year, and from the ova laid by these in the early part of the season sprang the brood of *saucia* which was so widely distributed last autumn. At all events, the indigenous *saucia*, if there were any, may have been largely recruited in this way. There was a considerable range of variation among those which first emerged, while those which came out during January and February were mostly of the reddish form. I was inclined from this to think that it was the interpolated brood, as with some other species, that was most liable to variation, and that the reddish form was the constant spring form and type of the insect, which superseded the others as the conditions more approximated those of an early spring brood. I have, however, quite recently bred some specimens of a greyish form, and in all probability the variation is largely controlled by heredity. Unfortunately the females from which the ova were obtained were all worn, and, had they been fresh, I should have been ignorant of the coloration of the males. It would be interesting to know whether *saucia* is often taken in this country in the early part of the season, and what is the form usually found at that period.—WM. EDWARD NICHOLSON, Lewes. *February 27th, 1893.*

Some years ago, Mr. Nicholson was good enough to send me a dozen eggs of *A. saucia*. These fed throughout the winter on dock, but after they were about half-an-inch long I never saw them as they went below the sand by day and fed only at night. I was very busy at the time, and finding, in March, that they did not eat the dock, I took it for granted that they were all dead (as I did not expect a spring brood), and left them in the greenhouse uncovered. About a month afterwards my friends Messrs. Porritt and Tugwell turned up at my house, and, telling them the history of my *saucia*, the latter gentleman remarked, "I'll tie them up, you'll get an early brood out!" He tied a piece of muslin over the flower pot, and sure enough the following week I bred and set 13 moths. This was in May. Mr. Nicholson's dozen eggs had been a baker's dozen (13), and I had bred the lot! They were all, without exception, of the red form.—J. W. TUTT.

COLIAS EDUSA IN NOTTS.—In September last, on the old Roman Fosse Road near Cotgrave, I took half-a-dozen fine specimens of *edusa*, one of which—a female—has the wings suffused with a beautiful pink most noticeable on the under side. A few days previously I netted one on a sunflower in the garden, which proved to be a very small male, much lighter in the ground tint than usual. The specimen was quite fresh, and had evidently been reared in the immediate neighbourhood. I may add that sunflowers seem very attractive to all kinds of lepidoptera, especially *Vanessa atalanta*, which was exceptionally abundant with us last season; and I have counted as many as four at once sunning themselves on the same flower-heap.—A. R. LEIVERS, Clinton House, Sherwood Rise, Nottingham.

SPRING NOTES.—In Epping Forest, on the 12th of March, I found *Phigalia pedaria* and *Amphidasys prodromaria*; *Nyssia hispidaria* has been very common; *Brephos parthenias* was out amongst the birches, and *Asphalia flavicornis* has appeared. The fallows are now beginning

to blossom, I saw some fine male catkins well out.—AMBROSE QUAIL, 15, Stamford Hill, N.

Seaton.—The magnificent weather which continued throughout March, caused many species of lepidoptera to emerge at an unusually early date. By the 8th of the month the sallow bloom was nearly over; at it, the *Tæniocampa* and many of the early Geometers appeared in great quantities on the 15th inst. I took some *Amphidasys strataria* at the lamps. The first butterfly I saw was *Pieris rapæ*, on the 14th February, but throughout March I have noticed many hybernated sorts, including several *Colias edusa*, in the sunny situations sheltered by the cliffs.—JOHN N. STILL, Seaton, Devon. [It would be well if lepidopterists who observe *C. edusa* this spring, would actually capture them and determine their sex, afterwards of course setting them free again.—Ed.]

Wye Valley.—Although for the last three weeks we have had hard frosts, the heat in the day-time has been most exceptional, in fact, since the 20th January we have had no severe weather here. I took *Tephrosia crepuscularia* early in February, *Euchloë cardamines* and *Lycæna argiolus* on the 25th of March. Kept in a cool place, ova of *Orthosia lota* and *macilenta*, *Anchocelis rufina* and *Orrhodia spadicea* hatched in February. Imagines of *Hadena thalassina* and *Notodonta chaonia*, appeared early in March; the pupæ being kept in a cold room, and by the third week in March, larvæ of *Aplecta nebulosa*, *Noctua festiva* and *Plusia pulchra*, had all pupated, while larvæ of *Angerona prunaria* are now spinning up.—A. NESBITT. April 4th, 1893.

Leatherhead.—I do not know whether *Nyssia hispidaria* has been previously recorded from this district: the occurrence of a specimen at light on the 5th of March may be of interest. I met with a single specimen of *Aleucis pictaria* on the 2nd of April, also at light; some attention to the luxuriant masses of black-thorn blossom upon the commons near, both at and after dusk, has failed to reveal any further specimens of this species. I record *Hybernia leucophæaria* first on the 2nd of February. On the 19th it was common on trunks of oak trees, some drying their wings during the fore-noon in the sunshine; the lantern revealing them still freshly emerging, after dusk on the same day. *Phigalia pilosaria* was seen on the same occasion hanging with limp wings on the oak-trunks, at about 8 o'clock p.m. On March 4th *H. leucophæaria* was seen in great abundance and charming variety on some fences near Esher. From a wooded common near Dorking I was able to record a specimen of *Vanessa polychloros*, amongst other hybernated butterflies seen on March 31st.—R. M. PRIDEAUX, Ashted, Surrey. April 10th, 1893.

Weymouth.—To-day I saw a specimen of *Colias edusa*; this early appearance may be of interest to your readers. Should you think it an immigrant or a hybernated specimen?—A. FORSYTH, Avondale, Ranelagh Road. April 4th, 1893. [Most probably hybernated.—Ed.]

VANESSA POLYCHLOROS SEEN IN LONDON.—On the 8th of March, I was walking up the Victoria Embankment, about 2 p.m. It had been fine all day, but just at that time the sun was particularly powerful. A large insect came swooping down over my head from behind me, and fluttered about in front of me. I was pretty sure of its species, but it soon solved my doubts, by settling and expanding its wings within two yards of me. It was a perfect, and apparently fresh specimen of *Vanessa polychloros*. I immediately made for it with my

top-hat, but it flew into the garden on my left. I did the same, only I had to fly round by the gate, and by that time, the specimen had disappeared, and I saw no more of it.—L. J. TREMAYNE, College Hill Chambers, 23, College Hill, E.C.

LARVÆ OF *STAUROPOUS FAGI*.—Last year I purchased a dozen young larvæ (probably about twelve days old), and having lost one in the first two or three days, reared all the rest in a sleeve, on a single spray of beech (renewed as required), but though they were thus closely confined, I saw no single instance of fighting, nor was there one damaged, with the exception that one lost a joint of a leg, though there were often two on a leaf, and on two occasions at least, when I had been away from home for a night, there was not an atom of food for them in the morning, till about ten o'clock. Of the eleven that I reared, nine spun between leaves on the twig, and two on the wooden floor (I had by this time covered them with a gauze cylinder, on wood) in each case, covering themselves with a leaf. I was particularly struck with the neat way in which they spun the leaves together, so that it was impossible to tell by merely looking at the branch, where the cocoon was. I had, at first, a few eggs, but the young larvæ refused to eat oak, which was all I had to give them, and all died.—W. W. ESAM, Eagle House, St. Leonard's. February 22nd, 1893.

COLEOPTERA AT SUDBURY.—Having heard that *Homalota gemina* was to be taken in this locality, I paid it a visit on January 28th with the following result:—Under the bark of a dead stump in the hedge-row, between Willesden and Sudbury, I found a long series of dead *Hylesinus vittatus*, and a little further along the road, two specimens of the rare *Ischnoglossa corticina* under oak bark. Nothing further turned up till I reached Harrow Weald, where a suitable haystack presenting itself, I set to work, and from the refuse at the base of the stack I took *Oxyptoda vittata*, *O. opaca*, *O. nigripa*, *Lithocharis melanocephalus* and *propinquus*, *Platystethus capito*, *Calyptromerus dubius*, *Euplectes sanguineus*, *Eumicrus tarsatus*, *Ceuthorrhynchus troglodytes*, var. *chevrolati*, *Monotoma quadricollis* and *Leptacinus batychnus*. Coming back to Willesden across a corner of Wembley Park, I noticed an elm stump in the ground; it was a large one in circumference, but not more than four inches above ground, and had moss growing over the bark and top of the stump, so I took off all the bark and moss, and brought it home to examine, and was well repaid for the trouble, as in addition to *Rhizophagus perforatus*, and a series of *Lathrobium longulum* and *Atomaria nana*, I took three *Homalota autumnalis*, 2 *H. soror*, 4 *H. debilis* (all light coloured specimens), 2 *H. angustula*, 12 *H. decipiens*, 1 *H. cuspidata* and *H. analis* of all colours in swarms. *Homalota gemina* did not put in an appearance, although I took about 50 or 60 *Homalota analis* in the hope of finding some among them.—H. HEASLER, 17, Danby Street, Peckham. S.E.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—March 8, 1893.—Dr. D. Sharp exhibited a species of *Enoplotrupes* from Siam, which was believed to be new, and which he thought Mr. Lewis intended to describe under the name of *E. principalis*. This insect has great power of making a

noise, and the female seemed in this respect to surpass the male. Mr. W. F. H. Blandford said he wished to supplement the remarks which he made at the meeting of the Society on the 8th of February last, on the larva of *Rhynchophorus*. He stated that he had since found that only the first seven pairs of abdominal stigmata were rudimentary. The posterior pair were well developed, and displaced on to the dorsum of their segment, which was thickly chitinated, and bore a deep depression, on the margins of which the spiracles were situated. He suggested that the absence of lateral spiracles was perhaps correlated with the wetness of the larval burrows, and that it was a displacement of the posterior stigmata, usually supposed to be restricted to aquatic coleopterous larvæ. He added, that dissection showed that the posterior pair were the principal agents of respiration. Dr. Sharp and Mr. Champion made some remarks on the subject. Mr. W. H. B. Fletcher exhibited a long series of bred *Zygæna lonicera* and *Z. trifolii* hybrids of the first generation, with the following parentage:—*Z. lonicera*, male—*Z. trifolii*, female; *Z. trifolii*, male—*Z. lonicera*, female; also hybrids of the second generation between *Z. trifolii*—hybrid and *Z. lonicera*—hybrid. The President enquired whether the hybrids were robust and healthy, or the reverse. Mr. Fletcher stated that many of the hybrids were larger than the parent species, and that some hybrids between *Z. lonicera* and *Z. filipendula*, were the largest he had ever seen. He added that *Zygæna meliloti* would not hybridise with *Z. lonicera*, *Z. trifolii* or *Z. filipendula*. Mr. Barrett and Mr. Tutt continued the discussion. Mr. F. W. Frohawk exhibited a bred series of *Vanessa atalanta*, showing the amount of variation in the red band of the fore wings of the female. In seven specimens there was a white spot on band, and in ten specimens it was absent. Mr. Elwes exhibited a large number of specimens of *Chrysophanus phlaeas*, from various places in Europe, Asia and North America, with the object of showing that the species is scarcely affected by variations of temperature, which was contrary to the opinion expressed by Mr. Merrifield in his recent paper "On the effects of temperature in the pupal stage on colouring," &c. Mr. McLachlan, Mr. A. J. Chitty, Mr. Bethune-Baker, Mr. Tutt, Mr. Barrett and Mr. Frohawk took part in the discussion which ensued. Dr. Sharp read a paper entitled "On Stridulating Ants." He said that examination revealed the existence in ants of the most perfect stridulating or sound-producing organs yet discovered in insects, which are situated on the 2nd and 3rd segments of the abdomen of certain species. He was of opinion that the structures which Sir John Lubbock thought might be stridulating organs in *Lasius flavus*, were not really such, but merely a portion of the general sculpture of the surface. Dr. Sharp said that the sounds produced were of the greatest delicacy, and Mr. Goss had been in communication with Mr. W. H. Preece, F.R.S., with the view of ascertaining whether the microphone would assist the human ear in the detection of sounds produced by ants. Mr. Preece had stated that the microphone did not magnify, but merely reproduced sound, and that the only sounds made by ants, which he had been able to detect by means of the instrument, were due to the mechanical disturbance produced by the motion of the insects over the microphone. A long discussion ensued, in which the President, Canon Fowler, and Messrs. Champion, McLachlan, Goss, Hampson, Barrett, Jacoby and Burns took part. Mr. C. J. Gahan read a paper entitled "Notes on the

Longicornia of Australia and Tasmania, Part I.; including a list of the species collected by Mr. J. J. Walker, R.N., and descriptions of new forms."

March 29th, 1893.—Mr. G. C. Champion exhibited, for Mr. A. E. Stearns, a living specimen of a luminous species of *Pyrophorus*, which had been found in an orchid house at Dorking. It was supposed to have emerged from the roots of a species of *Cattleya* from Colombia. Mr. A. H. Jones exhibited living full-grown larvæ of *Charaxes jasius*, found by Mr. Frederic Raine, at Hyères, feeding on *Arbutus unedo*. Surgeon-Captain Manders exhibited a series of *Lycena theophrastus* from Rawal Pindi, showing climatal variations, the rainy-season form being of darker coloration, and larger than that occurring in the dry season. The ground colour of the former on the under surface was markedly white, with deep black striz; in the latter form the ground colour was distinctly reddish, and the marking reduced to reddish lines. He said that the latter form had been described as *L. alteratus*. Mr. F. Merrifield mentioned that Dr. Weismann had now established that the colouring of *Chrysophanus phleas* in different climates or seasons, though in part attributable to the actual temperature, was in part constitutional. Mr. S. G. C. Russell exhibited a beautiful variety of *Argynnis selene*, taken near Fleet, Hants; two varieties of *A. selene* from Abbot's Wood, Sussex; typical specimens of *A. selene* and *A. euphrosyne* for comparison; and a remarkable variety of *Pieris napi* from Woking. Mr. C. J. Gahan exhibited a microscopic preparation of the antenna of the larva of a beetle (*Pterostichus*), for the purpose of demonstrating the sensory nature of the so-called "appendix" of the antenna. Since he wrote a note describing this structure, a short time ago, he found that Professor Beauregard had already suggested its sensory character, and was inclined to believe that it was an auditory organ. Mr. H. Goss exhibited a specimen of *Trogus lapidator*, Grav., believed to have been bred from a larva of *Papilio machaon*, taken in Norfolk, by Major-General Carden. Mr. Goss stated that he sent the specimen to the Rev. T. A. Marshall, who said it was a well-known parasite of *P. machaon* on the Continent, but not proved to exist in the United Kingdom. Mr. Merrifield said he knew this parasite, and had bred several specimens of it from pupæ of *P. machaon* received from Spain. Colonel Swinhoe read a paper entitled "The Lepidoptera of the Khasia Hills. Part I." A long and interesting discussion ensued, in which Mr. Elwes, Mr. Hampson, Colonel Swinhoe, and others took part. Mr. W. Bartlett Calvert communicated a paper entitled "New Chilian Lepidoptera." Mr. J. W. Shipp communicated a paper entitled "On a New Species of the Genus *Phalacrognathus*."—H. Goss, *Hon. Secretary*.

SOUTH LONDON ENTOMOLOGICAL SOCIETY.—*March 9th, 1893.*—The President, Mr. J. Jenner Weir, exhibited specimens of *Diurnæa fagella*, Hb., taken 50 years ago, near London, and Mr. R. Adkin remarked that they were as light as any now taken in the Metropolitan district. Mr. Jenner Weir also noted the capture of *Vanessa io*, L., by his brother on 19th February, near Sevenoaks; and that he had seen *Gonopteryx rhamni*, L., on the wing on 9th March. Mr. Fenn reported *G. rhamni* as having been common near Leatherhead at the end of February. A discussion arose as to the occurrence of *Polyommatus dispar*, Haw. at Camberwell 50 years ago, and Mr. Fenn and Mr. Tugwell both recorded probable Kentish specimens previous to

1848. Mr. Tutt confirmed the capture of *Melanippe galiata*, Hb., near Huddersfield, as recorded by Mr. Mansbridge in his paper read before the Society on February 9th. Mr. R. Adkin exhibited for Mr. E. H. Watson, a specimen of *Pieris brassicæ*, L., which approached very nearly *Pieris cheiranthi*, Hb. of the Canary Islands. The specimen, a female, was bred from larvæ found in a garden at Streatham. Also two specimens, females, of *Apatura iris*, L., bred from larvæ taken in the New Forest in the autumn of 1891. Mr. G. B. Routledge exhibited a small collection of butterflies from Algiers, Hyères and Switzerland, including *Pararge ægeria*, Esp. (types), *Linumitis camilla*, Schiff. and *Polyommatus virgaurea*, L. (females). Mr. R. Adkin exhibited a series of *Vanessa urticæ*, L., bred during 1892 in Sutherlandshire, which were generally dark in colour, and with markings well defined; also a specimen bred from the Essex Coast, unusually light in colour. Mr. Sauze, a small collection of *Ichneumonidæ*, captured in the perfect state. Mr. Jenner Weir exhibited specimens of a group of the *Nymphalinee* from the African region, mimicking others from the groups *Danainæ* and *Acraeinæ*. An interesting discussion ensued, Mr. Tutt pointing out the possibility of similar environment and habit having originally determined the similar facies seen in mimetic species of widely different genera. Mr. Weir referred to the fact that non-scented butterflies had been found to be eaten by birds, but scented species never so found; and Mr. South said that butterflies of the order *Danainæ*, generally escaped the attacks of mites in collections.

March 23rd, 1893.—Mr. R. Adkin exhibited the following species of Diurni from Sutherlandshire:—*Pieris brassicæ*, L., *P. rapæ*, L. and *P. napi*, L., *Argynnis selene*, Schiff., *A. euphrosyne*, L. and *A. aglaia*, L., *Epinephele janira*, L., *Cenonympha typhon*, Rott., and *Thecla rubi*, L., and commented on the similarity of the forms shown, to those occurring in the South of England. He noticed, however, in the *C. typhon* that, although there was a considerable variation in the colour, in none were the dots on the hind wings prominent, as in many of the Rannoch specimens. The specimens of *A. selene* and *A. euphrosyne* shown were so remarkably alike, as to render it extremely difficult to distinguish with certainty the one species from the other. Mr. H. Moore exhibited a striking example of fasciation in the young wood of *Salix caprea*, also an example of the transference of the scales to paper of an Indian butterfly of the Nymphaline group. Mr. W. Mansbridge stated that the specimen he previously exhibited as *Hybernia defoliaria*, Clerck., was a melanic form of *H. aurantiaria*, Esp., Mr. A. W. Dennis having drawn his attention to the fact. Mr. Mansbridge exhibited a drawing of the antennæ of these two species, shewing the difference existing; also dark *Odontopera bidentata*, Clerck, from Forres; a strikingly light specimen of *Hybernia leucophaæaria*, Schiff., and a series of *Polia chi*, L. var. *suffusa*, from Horsforth and Leeds, darker than those from either Bradford or Huddersfield, and therein differing from Mr. Tutt's experience as previously expressed.* Mr. H. A. Auld exhibited a species of *Cassida* from Fort White, Upper Burmah. Mr. T. W. Hall remarked on Mr. Moore's exhibit of *Salix caprea*, and Mr. Mansbridge said he had seen the same peculiarity in Liliaceous plants. Mr. J. M. Adye

* We are perfectly unable to understand Mr. Mansbridge's ideas of the varieties of this species.—Ed.

exhibited two living examples of *Moma orion*, Esp. (forced) bred from New Forest larvæ taken of 1892. This exhibit was made in small metal boxes, and a discussion on the latter ensued; Mr. Tugwell considering they would store heat, and so make the enclosed insects restless, but Mr. Winkley said he had used this form of box for *Argynnis paphia*, L., &c., without harmful results. In further illustration of the phenomenon of mimicry, Mr. Jenner Weir exhibited *Nebroda echaia* var. *jacksoni*, which was closely mimicked by both a Nymphaline and Papilionine species, viz., *Hypolimnas mima* and *Papilio cenea* ♀; the latter species being the southern form of *Papilio merope*, which was remarkable for the polymorphic and polychromatic varieties of the female. Mr. Weir also exhibited two other similar instances, species from Western Africa and Northern India; being also mimicked by both Nymphaline and Papilionine species, and made some interesting comments thereon.—F. W. HAWES and H. WILLIAMS, *Hon. Secs.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—*March 13th, 1893.*—Mr. W. E. Sharp read a paper entitled, "Notes on some Irish and other Coleoptera." After describing the division of England and Ireland from the Continent, he proved by the insect fauna that it was probable Ireland was the first to be separated, and enumerated many species taken by himself, including *Philonthus lucens*, new to the Irish fauna. He then read a list of additions to the local fauna. Mr. Willoughby Gardner, F.R.G.S., read a paper, entitled, "Notes on some of the rarer Aculeate Hymenoptera of our district." After presenting a copy of his *Hymenoptera Aculeata of Lancashire and Cheshire* to the Society's library, he described several species rare in the district, for which he asked lepidopterists and others to keep a look out during their entomological rambles. Both papers were well illustrated by specimens. The President exhibited specimens of *Bombyx quercus*, including some fine varieties. Mr. Green, a collection of local Hymenoptera. Mr. Watson, *Papilio machaon* from England, Northern India, Japan, &c., and its huge variety *hippocrates* from North-East China. Mr. Jones, on behalf of Mr. Bowler, a specimen of *Sphinx convolvuli* captured at Broadgreen.—F. N. PIERCE, *Hon. Sec.*, 143, Smithdown Lane, Liverpool.

NOTTINGHAM ENTOMOLOGICAL SOCIETY.—At the weekly meeting of this Society on February 27th, Mr. Pearson read a paper entitled "Collecting in the Fens," illustrated by insects captured there last summer. At the following meeting, Mr. J. G. Clarke read a paper on "Ants."—W. FERRIS, *Hon. Sec.*

BIRMINGHAM ENTOMOLOGICAL SOCIETY.—*February 20th, 1893.*—The following exhibits were made: Mr. R. C. Bradley, a good series of the genus *Conops*, taken at Wyre Forest last year, in company with Mr. G. Verrall; he found them in unusual numbers, and obtained the following four species—*flavipes*, *cericeiformis*, *quadrifasciatus* and *strigatus*. Mr. Baker, a box containing a number of rare and local insects, mainly Continental, including *Plusia moneta*, *Arctia lubricipeda* var. *zotima*, etc.; also pale ♂ of *Arctia mendica* from Ireland, and many others. Mr. G. W. Wynn, a number of NOCTUÆ, bred from hibernating larvæ found in the spring of 1892, on Marston Green or Wyre Forest, but containing nothing rarer than *Triphena fimbria*. Mr. W. Harrison, living larvæ of *Sesia tipuliformis*. Mr. P. W. Abbott read two short papers illuminated with specimens, one upon his work at

Wyre during 1892, where he had been working new ground, and turned up a lot of new things; the other, upon a holiday spent at Freshwater, Isle of Wight, in August.—COLBRAN J. WAINWRIGHT, *Hon. Sec.*

YORK AND DISTRICT FIELD NATURALISTS' SOCIETY.—*February 8th, 1893.*—Mr. W. Hewett exhibited *Zygæna minos* from Galway; *Lophopteryx carmelita*, Marlow; *Emydia cribrum*, New Forest; and five very fine varieties of *Spilosoma lubricipeda* from Barnsley, Driffield, and York one from Driffield having the hind wings of the var. *radiata* colour, viz.: smoky black, the base, wing rays and fringe alone being cream-coloured; the head and thorax cream-coloured; the body yellow, with six black spots down the middle and on each side; the antennæ simple; the fore wings typical; an exceedingly fine variety of *Arctia caia* from Hull. This variety has the fore wings of an almost uniform brown colour, the hind wings, with the exception of the base and fringe, being black; *Spilosoma mendica* from Ireland; *Stauropus fagi* from Reading and Marlow; *Acronycta myricæ* from Aberdeen; *Bisulcia ligustri* from Willesboro'; and *Polia chi* var. *olivacea* from Driffield; *Luperina testacea* bred from York, and dark forms from Hartlepool; *Dasydia obfuscaria* from Braemar; and *Eupithecia subfulvata* from Brockley. (Is *E. subfulvata* now a Brockley insect? Ed.).—WILLIAM HEWETT, *Hon. Sec.*

THE CAMBRIDGE ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*Friday, January 20th.*—Mr. Rickard exhibited some interesting Orthoptera and other insects from South Africa, among which were specimens of *Harpax ocellaria* and *Cystococlia immaculata*; Mr. Farren, specimens of *Dasydactylus rubiginosa* bred from the egg by Dr. Ridgway, and, for comparison, four specimens from the collection of the late Mr. T. Ross. Dr. Ridgway had described the specimens he bred as varieties, the variation consisting of the presence of some white dots in the anterior wings, the chief of which being a row of six near the subterminal line, and two near the base of the wing; Mr. Farren pointed out that these white dots were also present in the specimens from Mr. Ross' collection; Mr. S. W. Key, a cocoon of *Cossus ligniperda* spun on a piece of firewood.

Friday, February 3rd.—Mr. Farren read a paper "On the Variation of *Papilio machaon*," which was illustrated by diagrams, and over 80 specimens, among which were some showing the development of red in the posterior wings, ranging through intermediate forms from some with the submarginal yellow lunules quite clear, to others with all six lunules suffused with red; also several with a suffusion of red inside the submarginal band; others had the submarginal band so wide as to reach, and almost enclose, the black patch at the end of the discoidal cell. Messrs. Jones, Rickard, Shrubbs and Farren, took part in the discussion which ensued.

February 17th, 1893.—Annual Meeting.—Mr. Gibson of Queen's College was elected a member. An abstract of the Secretary's and Treasurer's reports showed the Society to be in a very satisfactory condition; 31 members were elected during the year, and the meetings held fortnightly during the University Terms had been well attended, and the exhibits numerous and interesting.

The officers were then elected for the year, Mr. F. V. Theobald, B.A., F.E.S., being chosen President.

Mr. Rickard exhibited British specimens of *Saperda carcharias*, an unnamed species of the genus *Necrophorus*, *Trichosoma betuleti*, *Sirex*

gigas, a dark variety of *Vespa vulgaris*, *Reduvius personatus* and its pupa, *Bombylius major*, and an unnamed species of *Tachina*; and from South Africa two species of scorpions, "trap door" spiders and their nests or galleries, and a Crustacean parasitic on fishes; also, four skins of the great African Kingfisher, *Ceryle maxima*. Mr. Theobald, larva, pupa, and imago in spirit of *Tipula maculosa*, and a number of specimens of a species of *Agromyza*, the larvæ of which had been found doing considerable damage—mining the leaves and shoots of chrysanthemums in greenhouses.

March 3rd.—Mr. W. H. Seyfang of St. Peter's College was elected a member. Mr. Moss exhibited a *Sialid* (species?) from Rome, and a box of Lepidoptera, most of which he had "forced" during January; among others, were specimens of *Papilio machaon*, *Smerinthus tilix*, *Notodonta ziczac*, and most noteworthy, a series of *Bombyx rubi*, on which he contributed notes.* A discussion was carried on by Messrs. Theobald, Farren, Fitzroy and Jones. Mr. Theobald, some larvæ of an unknown species of *Tipula* in rotten wood from Gloucestershire, microscopic slides, and photos of them; No. 1, a larva of *Simulium*; No. 2, a larva of a new *Tanytus*; No. 3, an undescribed dipteran and its pupa. Mr. Jones, a series of *Agrotis exclamatoris* and its varieties, *costata*, Tutt; *plaga*, St.; *pallida*, Tutt; *lineolatus*, Tutt, and *juncta*, Tutt. Mr. Farren, *Orphiedes demoleus*, taken in South Africa by Mr. T. C. Rickard, and varieties of *Papilio machaon* from Wicken Fen; and remarked on the philogenetic value of certain corresponding markings; a bred series of *Orobena extimalis*, Scop. = *margaritalis*, Schiff.; and representative species of Pterophori, Crambi, Tortrices, and Tineina. Mr. Bryan read a paper on "Relaxing and Setting Insects," and exhibited appliances and drawings in illustration. A long discussion ensued, Messrs. Theobald, Jones, Farren, Bull, White and others taking part.—W. FARREN, *Hon. Sec.*

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*Tuesday, 21st February, 1893.*—Exhibits:—Dr. Buckell, a series of *Coremia unidentaria*, bred from a black-banded female; the males being all black-banded, and the only female, red-banded. Mr. Prout, red varieties of the same species, bred from a typical female from Sandown. Mr. Robson, *Zygæna filipendulæ*, with five spots on the fore wings, also two specimens of the var. *cerinus*; and a female of *Arctia mendica*, with cream-coloured anterior wings. Mr. Nicholson, an asymmetrical specimen of *Catocala sponsa*, from the New Forest. Mr. Bellamy, *Luperina cespitis*, taken on lamps at Winchmore Hill. Mr. Bacot, bred series of *Sphinx ligustri*, from Folkestone and Hadleigh. Mr. Hollis, variable series of *Hybernia defoliaria*, from Highgate. Mr. Machin, a British specimen of *Sphinx pinastri*, and melanic forms of *Boarmia abietaria*, bred from Box Hill larvæ. The following were among the exhibits of melanic lepidoptera:—Mr. Hodges, a number of species, including *Stauropus fagi*, *Agriopis aprilina*, *Caradrina cubicularis* and *Melanthia rubiginata*. Mr. Smith, dark females of *Argynnis aglaia*, from Blandford. Mr. Simes, black vars. of *Noctua xanthographa* and *Agrotis nigricans*, from Aberdeen, and a dark underside of *Chortobius pamphilus*, from Epping. Mr. Riches, dark forms of *Hemerophila abruptaria*. Mr.

* This paper is given in full under the head of "Practical Hints" in this month's number.—ED.

Battley, *Cuspidia psi*, *Aplecta nebulosa*, *Hybernia progemma*, &c., from the London district. Mr. Clark, a black specimen of *Limenitis sibylla*, and suffused forms of *Polyommatus phlæas* and *Venilia maculata*. Mr. Tutt, dark and light forms of *Xylophasia polyodon*, *Gnophos obscurata*, and *Tephrosia biundularia*. Dr. Sequeira, *Boarmia repandata*, *Hemerophila abruptaria*, and *Polia chi* var. *olivacea*. Coleoptera. Mr. Heasler, *Quedius scitus*, *Opilus mollis*, and *Cis nitidus*, all from Richmond. Mr. Bellamy, stuffed specimens of the Fieldfare and Green Woodpecker. Mr. Robson then read his paper entitled "Is Melanism in Lepidoptera caused by Moisture?" in which he briefly reviewed the different notes which had appeared, written on the subject, and criticised at length some of the views dealt with in Mr. Tutt's *Melanism and Melanochroism in British Lepidoptera*, finally answering the question in the negative, and expressing his opinion that melanism was due to deficient sunlight. Mr. Tutt, in proposing a vote of thanks, criticised the paper at length, and ridiculed the position assigned by Mr. Robson to Mr. Birchall's paper. He complained that Mr. Robson had simply brought to light a second-hand theory of Lord Walsingham's, and had given no data to support his conclusion. Not only had Mr. Robson given no data supporting this, but he had neglected the experimental evidence to the contrary, which had been brought forward by Messrs. Merrifield and Poulton. He maintained that an agent was required to act on the larva physically, and produce variation, and that then "natural selection" was the all-important factor. Meteorological conditions offered such a primary agent—moisture and probably temperature being the most powerful factors, whilst smoke, probably, also acted constitutionally; smoke and moisture also darkened objects, hence they acted indirectly as well, and in the direction of the production of melanism. Mr. Robson's suggestions were entirely unable to meet very many common cases of melanism, where melanic and pale varieties occurred side by side, and where "natural selection" was clearly the essential factor. Dr. Chapman, who then spoke, considered that an exciting cause (or causes) was necessary to produce variation, and that "natural selection" was the means by which distinct races were then developed. A further animated discussion followed, the proceedings terminating with a vote of thanks (proposed by Mr. Tutt, and seconded by Dr. Buckell) to Mr. Robson, for his kindness in coming from Hartlepool to read the paper.

Tuesday, 7th March, 1893.—Exhibits:—Dr. Sequeira, *Anisopteryx æscularia* and *Hybernia leucophæaria*, taken that day in Victoria Park. Mr. Battley, a living female of *Nyssia hispidaria*, from Epping Forest; also various fossil shells from the Red Crag at Felixstowe. He pointed out that the spiral shells were turned the opposite way to the forms now existing. Mr. Riches, shells of *Helix virgata*, *H. ericetorum*, *H. cantiana*, *H. hortensis*, *H. nemoralis* and *H. aspersa*. Mr. Clark, specimens of the Swan Mussel (*Anodonta*). Mr. Soul, very fine specimens of the Paper Nautilus (*Argonauta argo*) and Pearly Nautilus (*Nautilus pompilius*). Mr. Rosevear, a selection of shells, to illustrate his paper. Mr. Bellamy, stuffed specimens of the Waxwing and Kestrel, from Yorkshire. Mr. Rosevear then read his paper on "Conchology." He claimed as advantages of this science, that it could be pursued at all times of the year, and in all weathers, that the specimens were easily preserved, and not liable to subsequent deterioration. He then pro-

ceeded to give an outline of the structures, life histories, and habits of various mollusca, and closed by referring to 'the recently established Malachological Society of London. Mr. Lewcock stated that the larvæ of *Hydrophilus picens*, fed on small water snails. He also proposed a vote of thanks to Mr. Rosevear; this was seconded by Dr. Buckell, and carried. Mr. Riches stated that he had taken *Biston hirtaria*, on March 3rd. Mr. Lewcock also recorded this species. Mr. Battley remarked that the fallows were already coming into bloom, some of the sheltered bushes being fully out.

Tuesday, 21st March, 1893.—EXHIBITS:—Mr. Clark, *Nyssia hispidaria*, *Phigalia pilosaria*, etc., from Chingford. Mr. Hollis, *Phigalia pilosaria*, *Hybernia leucophæaria* and *H. progemmaria*, from Highgate, two females of the latter being the melanic form. Mr. Riches, a variable series of *Hybernia leucophæaria* from Richmond. Mr. Hockett, suffused forms of *Hybernia progemmaria*, bred from Epping Forest larvæ. Mr. Battley, short series of *Procris statice*, *P. geryon* and *P. globulariæ*. Mr. Tremayne, *Leucania turca*, *Hyria auroraria* and many others, from the New Forest. Mr. Prout, series of *Gnophos obscurata* taken on the greensand at Sandown and chalk at Ventnor; he remarked that although these localities were only a few miles apart, the specimens responded to their environments, the Sandown forms being decidedly the darker. Dr. Sequeira, *Cymatophora ridens*, bred from New Forest larvæ. COLEOPTERA:—Mr. Heasler, *Kaploenemus impressus*, *Scaphidema ænea*, *Rhinosimus viridipennis*, *Scydmaenus horticolis* and *Euthia scydmaenoides*, all from Acton. Mr. Jarvis, *Plinthus caliginosus*, *Homalota plana*, *Prognatha quadricorne* and *Platyderus ruficollis*, from Wandsworth and Darenth.

Dr. Buckell then read the following paper:—

SPECIFIC NOMENCLATURE: PRESENT, PAST AND FUTURE.

I HAVE been led to invite your attention to-night to the thorny question of nomenclature by a profound conviction that the existing confusion and uncertainty which characterise our use of names at present in this country are discreditable to us as scientific entomologists and inconvenient to us as collectors. This state of things, although existing before that time, has become much more pronounced since the appearance of the *Entomologist Synonymic List*. Against the changes in accustomed use made in that *List* protests both active and passive have been plentiful, in which respect, however, it has only shared the same fate as its predecessor. This society, in particular, dealt short shrift to the intruder, resolving on August 21, 1884, "That many of the alterations are uncalled-for, and that a re-issue of the *Doubleday List*, with the addition of the new species discovered since the date of its publication, would have been far more acceptable to the great body of British entomologists." I hope to-night to convince you that the question of nomenclature must be settled by considerations of principle, and not merely of convenience. The subject is a large one, and I shall be fortunate if I do not weary you though I restrict myself to that part of it relating to specific, or, as I prefer to call it, *trivial* nomenclature. This restriction must be borne in mind when I come to deal with authorities. These may also be consulted in regard to arrangement, classification, and its dependent generic nomenclature, but I am concerned with them solely from the point of view of trivial nomenclature.

If entomologists are to communicate with one another, it can only

be upon the basis of a nomenclature common to all. The earliest nomenclature was a vernacular one. This country, Germany, France, and probably other countries, possessed such a nomenclature long before a scientific one came into being. Our own vernacular nomenclature is a very good one, but the necessity of intercommunication between workers speaking different languages requires the adoption of a common language for the purposes of scientific nomenclature, and by common consent and long-established usage Latin has been recognised as best fitted for the purpose.

In endeavouring to solve the problem of nomenclature, it is imperative to bear in mind that the fauna of these sea-girt islands is a part, and only a part, of the fauna of the world; that the insects we meet with are not confined to this country, and that, if we would take our proper place in the commonwealth of entomological science, we must fall into line with our brethren in other countries who have a much more extensive fauna to deal with, and must adopt the same names as are used by them. The chief difficulty arises from the multiplicity of names which some species have received. This is due to several causes. In some cases the same insect has been described or figured about the same time by two or more authors ignorant of each other's work, and has received a different name from each; in others, a pronounced local form has been supposed to be a distinct species, and has been named accordingly; sometimes even the two sexes have received distinct names. Again, an insect has been supposed to be identical with one described or figured, and named by an earlier author, and has been recorded under that name; later investigations, however, proving that the identification was inaccurate, we have two distinct species bearing the same name. We need, therefore, some principle to guide us in selecting the name we shall use. The British Association, recognising the importance of formulating some principles upon which nomenclature, which had in all branches of Zoology got into a condition of hopeless chaos, might be established on a uniform and permanent basis, appointed a committee to consider the subject. The report of this committee, which was submitted to the Association in 1842, contained a series of rules of so simple and satisfactory a kind that they received the approval of zoologists generally, both in this country and on the Continent, although it was nearly 20 years later before any serious attempt was made to apply them to entomological nomenclature and that was made, not by an Englishman, but by the German, Staudinger. The most important of these rules was that establishing what has since been known as the "law of priority," viz., that the name first given by the describer of a species should be permanently retained to the exclusion of all subsequent synonyms. This rule was qualified by a subsequent one, that for a name to establish its priority it must by its sponsor have been associated with the insect in a published work by such an adequate description or figure as would enable the subsequent identification of the insect by any competent person. In the main this "law of priority" has up to the present been accepted as the best means of attaining a permanent nomenclature. Opinions differ as to some of the details of its practical application and as to the results, but time forbids my entering into these.

In order to determine what is the earliest name which any given insect has received, it is necessary to examine all the published works

of entomological authors, and this is greatly facilitated by the copious references which every author, with the exception of the later British authors, gives to the works of his predecessors who have dealt with the insect he is describing. As probably many of the members of this society have as little acquaintance with the works of earlier authors as I had when I promised to read this paper, I trust that a historico-biographical sketch thereof may not be uninteresting. The *formative* period as regards trivial nomenclature of lepidoptera, comprises the last half of the last century and the first quarter of the present. At its commencement trivial names were invented, by its close the great bulk of European lepidoptera known to-day had received names. Fortunately our starting point is clear, we begin with the inventor of trivial names, the great Swedish naturalist, Linnæus. Before his time, naturalists were familiar with the use of a certain number of what we now call generic names, but when they desired to indicate a species they added to the generic name what was in effect a short description of the insect. For example: Albin, an English painter, who published in 1724 a volume of coloured plates of the various stages of the insects known to him, says of an insect which we have all captured, that it was called "*Papilio major nigricans alis maculis rubris et albis pulchris illustratis*." We know it as *Vanessa atalanta*. Linnæus, recognising the disadvantages of such a cumbrous method of nomenclature, invented the use of a single word to indicate the form, which he designated the *trivial* name, and which, in conjunction with the generic name, was henceforth to be the designation of the species, and this is known as the binomial system of nomenclature. Linnæus further adopted distinctive terminations for many of the groups, into which he divided lepidoptera. *Aria* and *ata* mark the two groups into which he divided his GEOMETRÆ; his TORTRICES all receive trivial names ending in *ana*; his PYRALES in *alis*, and his TINEÏNA in *ella*; a custom of very obvious convenience. He did not, however, adopt this principle with the Butterflies, Sphinges, Bombyces or Noctuæ. Linnæus' work embraced the three kingdoms of the natural world, the animal, vegetable and mineral. We are only concerned with that part of it which deals with lepidoptera. Of these he described and named every species known to him. His descriptions are not very full, but in some way such a wide-spread knowledge of his work was obtained that the names he gave found universal acceptance. To-day we call 45 of our *Rhopalocera* by the trivial names which he gave them. Another testimony to the wide-spread acquaintance with and acceptance of his names is afforded by the great number of them which stand in our lists without a later rival. But whilst there is a universal agreement that we must begin our researches with Linnæus, opinion has not been equally unanimous as to which of his works should be our *terminus a quo*. The British Association suggested that the 12th edition of the *Systema Naturæ*, published in 1767, should be the starting point; it seems, however, more reasonable to begin at the beginning, and that beginning is found in the 10th edition of the same work, published in 1758, which is the earliest of his works in which trivial names are used. Three years later we have, in the second edition of his *Fauna Suecica*, a volume dealing exclusively with the fauna of Sweden, and containing fuller descriptions than the *Systema Naturæ*, another valuable work of reference. The new system of nomenclature commended itself so thoroughly to naturalists that its

adoption rapidly became general. In 1759 it is used by Clerck, a Swedish artist, friend and disciple of Linnæus, in a work entitled, *Pictures of Rare Insects with their Trivial Names*, to which Linnæus refers in his 12th edition with marked approbation. In 1761, Poda, a member of the Society of Jesus, uses the system in a work on the insects found in Greece; to him we owe *corydon*. In 1763, Scopoli, a physician who was professor of botany and chemistry at Pavia, adopts it in a book (published in Vienna) of descriptions, accompanied with uncoloured figures of the insects found in Carniola, a district lying to the north-east of the Adriatic, in which many species are named for the first time. Some of Scopoli's names are earlier than those given by Linnæus in his 12th edition. Probably the first to introduce the Linnæan nomenclature into this country was Moses Harris, a miniature painter, who, under the title of *The Aurelian*, published in 1766 a folio volume of descriptions, with coloured plates of British lepidoptera. To this, apparently in the following year, he added a supplement containing, among other things, an index of the vernacular names of the insects dealt with, and against them "the trivial names of Linnæus, as far as can be collected from his works." In 1769, Dr. Berkenhout, an Isleworth physician, uses the Linnæan names in *The Outlines of the Natural History of Great Britain and Ireland*, a later edition of which is in our library. Neither Harris nor Berkenhout made any addition to the number of named species; the first to do so in this country was John Reinhold Forster, a Prussian, who came here in 1766, and was for some years a teacher at the dissenting academy at Warrington. He collected the insects of that neighbourhood, and in 1770 published a catalogue of British insects, which includes 45 butterflies and 158 moths. Next year he published descriptions of 100 species which had not been described by Linnæus, giving names to them. Four lepidoptera only are included in the 100; of these one is an Indian butterfly, the remaining three are *muralis*, which we know by its later name of *glandifera*; *miniata*, which he classes as a Geometer, and *fulvata*. Forster intended to publish a descriptive work on the insect fauna of this country; this intention was, however, frustrated by his appointment as naturalist to the second expedition of Captain Cook.

Passing now to Germany, we come to Hufnagel, a Berlin cleric, described by one who knew him well as a very accurate observer, a thorough connoisseur, and a zealous friend of natural history, who published a catalogue of the lepidoptera, found in the neighbourhood of Berlin, systematically arranged, and containing names, a description of imago, and (where known) of larva, with particulars of food—plant, season and locality. This catalogue, which only includes what we know as the Macro-lepidoptera, was published at intervals from 1766 to 1769, in the pages of a Berlin scientific magazine. The Linnæan names are adopted, and many new species named. Objection has been made to the admission of Hufnagel to a place in the ranks of the nomenclators, on the ground that his descriptions are not sufficiently precise and detailed for identification. This defect was noted at the time, and it appears that Hufnagel intended to correct it by the publication of more extended notes or figures, but was prevented, by appointment to some more onerous post, from carrying out this intention. Under these circumstances a friend and neighbour, Von Rottemburg, who had frequent opportunities of communication with him, and who

had access to his collection, undertook the task, and produced a series of notes on those species in Hufnagel's catalogue which needed further elucidation; he also gives descriptions of and names to some new species not mentioned by Hufnagel. Von Rottemburg's descriptions are elaborate enough to remove the difficulty of identification from Hufnagel's names. They appeared in a natural history magazine published at Halle during the years 1775-76-77. It is not surprising that, as it was only to be found in the pages of magazines, the work of these two men should have been less widely known than that of some of their successors. It was naturally best known to the German naturalists, and as we shall hereafter see, some of their names obtained currency in this country at an early period. A great many of the changes introduced into our nomenclature by the *Entomologist List* are due to the substitution of the names given by one or other of these authors for later ones. Of the thirteen changes in butterfly nomenclature, six are due to this cause. We next come to an authority, upon the exact value of which opinion is divided, and which is known by the name of the *Vienna Catalogue*, and is indicated in our lists by the letters W.V. or S.V., or by the contraction Schiff. This work was published anonymously in Vienna in 1776, but it soon became known that its authors were Schiffermüller and Denis, two of the teachers or professors in the Imperial College of the Thérésians. Denis, who was a Jesuit and was the librarian of the College, seems also to have been a poet. Schiffermüller, whom one would judge to have been the greater of the two collaborateurs, afterwards filled high offices in the Church. The work, which is a systematic catalogue of the lepidoptera found in the neighbourhood of Vienna, is arranged in three columns. The first of these contains the name of and particulars relating to larvæ; in the second, a German name is assigned to the imago, which is often to some extent descriptive, as for example in the case of *adonis*, which is called: "The brilliant sky blue (male) or blue-sprinkled brown (female) fringe-spotted butterfly"; the third contains the Latin generic and trivial name. The names already given by Linnæus are generally adopted and indicated by the letter L. References are also made to Poda and Scopoli, and where the names of those authors are not adopted their synonyms are given. A great many species, however, are named for the first time in the *Catalogue*. In addition, there are copious notes and observations and frequent reference to the figures of earlier authorities, such as Geoffroy, De Geer, Reaumur and others, and in a few instances of which *Agrotis segetum* is one, a detailed description and figure are given. Schiffermüller was highly esteemed by those who knew him as a careful student of life histories, and the *Catalogue*, especially under the influence of Hübner, rapidly became the paramount influence in nomenclature, which position it retained until the appearance of the second edition of Staudinger's *Catalog*. Staudinger, on the ground that the majority of its names are impossible of identification owing to the absence of adequate description or figure, rejects all such, or adopts them only on the authority of the later author who supplies the means of identification. This is, undoubtedly, simply the carrying out of the British Association rule already mentioned, but on the other hand it must be remembered that references are often given in the *Catalog* to figures of earlier authors, and that many of the later authors, Fabricius, Hübner, Ochsenheimer and Treitschke, certainly, and Esper and Borkhausen

probably, saw the type collection of Schiffermüller, and made their descriptions or figures from it. It seems to me that in this way we know with sufficient certainty what the insects were to which names are given in the *Catalogue*, and that if Hufnagel is admitted to rank for priority on the identification of Rottemburg, so Schiffermüller and Denis should be allowed the same honour in all cases where their names are attested by these later eye-witnesses.

We next come to three men, Fabricius, Esper and Borkhausen, who were to a large extent contemporaries, and whose published works overlap. Fabricius, a Dane, was Professor of Natural History at Kiel. From Linnæus, with whom he lived for two years on terms of the greatest intimacy, he acquired a love of order and accuracy of expression. He devoted himself to the study of the whole class Insecta. He was a great traveller, visiting this country many times, and making the acquaintance of the leading entomologists of the day. In 1784 he visited Vienna specially to make the acquaintance of the authors of the *Vienna Catalogue*, and to see the collection which contained their types. These he described in a work published in 1787, under the names used in the *Vienna Catalogue*, and in each case, with a precise reference to the *Catalogue*. In 1790 he visited Paris, where he varied his entomological studies by forming friendships with the leaders of the Revolution, and witnessed many of the scenes of that eventful period. Fabricius was a voluminous writer, and his works, the first of which appeared in 1775, and the last in 1798, although not illustrated, contain adequate descriptions, accompanied by references to, and synonyms from other authors. He shows no sign of any acquaintance with the labours of Hufnagel and Rottemburg. Many species are first named in his works, among them *edusa*. Esper, who was a Professor at Erlangen, confined his attention to lepidoptera. His work is in five volumes, the first of which appeared in 1777. It deals only with the macro-lepidoptera, and contains coloured figures with lengthy descriptions. References are given to Hufnagel and Rottemburg, and their names adopted. Fabricius, the *Vienna Catalogue*, and other authorities are also alluded to. Borkhausen, who was connected with the forest administration of Darmstadt, published at Frankfort, between 1788 and 1794, *The Natural History of European Lepidoptera*, in five volumes. In this the species are systematically arranged, full descriptions of imago, larva and pupa are given, and a few figures. Borkhausen, like Fabricius, was a profound student of the literature of his subject, and gives copious references to earlier authors. He was the last author of this period to recognise the claims of Hufnagel and Rottemburg as nomenclators. Meanwhile in Augsburg lived an artist named Jacob Hübner, who devoted his leisure to the study of lepidoptera, and to whom we are indebted for the most magnificent contribution to the literature of the subject that the world has ever seen, or is ever likely to see. This comprises three volumes containing over 400 plates coloured by hand of larvæ and pupæ with the food-plants, the artistic beauty of which is only equalled by their truthfulness. There are also five volumes containing more than 700 plates, similarly coloured, of imagines, in which are nearly 4,000 separate figures. There are also descriptions of the species figured and synonymic references to other authors. Hübner based his nomenclature to a very great extent on that of the *Vienna Catalogue*, using the *Catalogue* names, even where he knew that prio

names were in existence. It is not improbable that he was personally acquainted with Schiffermüller, whose name occurs among the subscribers to the work. A great many new species were named by him, and he has left his mark largely on our existing nomenclature. His publications, which include some smaller works, as well as his *Magnum Opus*, range from 1785 to 1824.

In 1795, William Lewin, an ornithologist as well as an entomologist, who lived at Dartford and Hoxton, published a volume of coloured plates of British butterflies, with notes in English and French on their habits, localities, food-plant of the larva, &c., but without descriptions of the imago. He uses the Hufnagel and Rottemburg names *icarus* and *thamas*, as well as some of the *Vienna Catalogue* names, but evidently acquired them in a round about way, as he attributes them all to Linnæus. Two years before, in 1793, Edward Donovan, a man of property, commenced the issue of a series of coloured figures with descriptions and observations of British specimens of the class Insecta. He was an abler man than Lewin, and seems to have possessed almost all the entomological literature available at that date, although he knew nothing of Forster, nor of Hufnagel and Rottemburg. He took Fabricius for his chief guide, and adopted his names even in preference to those of Linnæus. His work was not completed till 1802. He has left his mark to a slight extent upon our nomenclature, especially in the Micro-lepidoptera. Greater than either of these, and a man worthy to take his place by the side of the great Continental authors of the period at whom we have been glancing, was Adrian Hardy Haworth, a man of property, who, though educated as a lawyer, devoted his life to the study of Botany, Ornithology and Entomology. Part of his life was passed at Cottingham, in the neighbourhood of Hull, and part at Chelsea. He formed a collection of lepidoptera containing 1,100 species, and 300 varieties. Altogether he never travelled beyond his own country, he had an extensive acquaintance with Continental literature, being familiar with the works of all the writers we have mentioned save those of Hufnagel and Rottemburg. He published a work on British lepidoptera, the first part of which appeared in 1803, and the last in 1828. This contains ample Latin descriptions of all the species known to him, with copious references to the works of previous authors. In the preface he laments the fact that while his countrymen have acquired an extensive knowledge of botany, yet few in Europe have advanced with less success into the sister science of entomology. In nomenclature, he chiefly follows Hübner. Noticing that Linnæus had not applied the principle of a uniform terminal to the BOMBYCES and NOCTUÆ, he proposed to rectify what he considered a mere oversight of the great Swede by making all the trivial names of BOMBYCES end in *us*, and of NOCTUÆ in *ina*. This alteration, which he carried out in a preliminary catalogue, did not meet with general acceptance, as he confesses in an appendix, nor is this to be wondered at when it resulted in such names as *ziczacus*, *pisina*, *gammina*.

With Haworth, what I have designated the "formative period" of trivial nomenclature, comes to an end. It is true that from time to time names are given to newly discovered or differentiated species, but henceforth the chief attention of authors is given (and Hübner and Haworth mark a transitional period in this respect) to classification, and especially to the multiplication of genera and the origination of new

generic names. It is, however, necessary briefly to glance at succeeding authors, in order that the genesis of our conflicting lists may be traced, and the reasons for their differences made apparent. This will best be done by dealing separately with the French, the German, and the English workers.

No Frenchman has any conspicuous place in the ranks of the trivial name givers during the formative period. Fourcroy is the earliest author of whom I have heard as using trivial names in a work on *The Entomology of Paris*, published in 1785. In 1789, the year of the outbreak of the Revolution, appeared the first volume of a dictionary of insects, published as a part of the *Encyclopédie Méthodique*. A volume appeared in each successive year till 1792, and further volumes in 1811, 1819 (1823 ?) and 1825. The author of the first 5 volumes was M. Olivier, a physician. After his death the remaining volumes were edited by M. Latreille, who was also the author of that part of Cuvier's *Animal Kingdom* relating to insects. M. Latreille was arrested as a priest during the Revolution, and it is said that he escaped transportation owing to his discovery of a new insect while in captivity at Bordeaux. The volume published in 1819 (1823 ?) consists of a list of known *Rhopalocera*, with copious synonymic references, which show an acquaintance with all the authors whom we have already passed in review except Haworth. It was the production of M. Godart, who, two years later, commenced the publication of a work on the lepidoptera of France, consisting of descriptions and coloured figures. M. Godart dealt with the *Rhopalocera*, *Sphinges*, *Bombyces*, and about half the *Noctuæ*, but dying in 1825 the work was completed by M. Duponchel, the director of the *Theatre Français*, the last volume being published in 1842. Two years later Duponchel published a systematic catalogue of European lepidoptera. Boisduval in 1829 had issued a similar list of Butterflies, *Sphinges*, *Bombyces* and *Noctuæ*. He was a physician, and received from Newman in 1845 the designation of "prince of lepidopterists." In 1836, he produced the 1st volume of a descriptive work, which, however, only dealt with part of the butterflies. Eleven years later, finding himself unable to carry out his project unaided, he called to his assistance M. Guenée, a lawyer of Chateaudun, who was also a profound student of lepidoptera in all the stages of their existence, and who had already published in 1835, in conjunction with De Villiers, a work on the butterflies of Europe. Boisduval reserved to himself the *Sphinges*, *Bombyces*, and the remainder of the Butterflies, and to Guenée was assigned the task of dealing with the rest. M. Guenée ably discharged his task, and his 3 volumes on the *Noctuæ* have long taken rank as a classic. His part of the work was completed in 1857. Boisduval never succeeded in getting any more of his share ready, but in 1840 he issued a revised edition of his 1829 catalogue, in which he adopted the uniform termination *aria* for all *GEOMETRÆ*, and which formed the groundwork of Doubleday's first list. The dominant influence on the French naturalists, especially the earlier ones, was that of Fabricius; preference is given to his names, and great value is attached to the *Vienna Catalogue*. By the later authorities, Hübner is exalted to the place of honour, but his influence still causes the retention of *Vienna Catalogue* names. The principle, which seems to have guided them in dealing with nomenclature, was to adopt the names used by the authority whom they took as their chief

guide, although they were frequently aware of earlier names. Godart is the only one who shows evidence of a profound study of synonymy, and he alone gives references to Hufnagel and Rottemburg in the *Encyclopædia* list of butterflies. Guenée formulates the principles which guided him in the names he adopted, the general tendency of which was to accept priority of publication, but not as giving the right to disturb long established usage. He emphatically declares his adhesion to the *Vienna Catalogue*. One curious principle he adopts is to place after a name, as its sponsor, the author who first described or figured the insect, whether he really gave the name or not. As a result he attributes many names to authors who lived in the pre-Linnæan times—an unscientific method in which he was not followed by Doubleday. Returning now to Germany, we find that Hübner was succeeded by Ochsenheimer an actor of repute in Leipsig who in 1807 commenced the publication of a treatise on European lepidoptera. This consists of descriptions of larvæ, pupæ and imagines, with copious synonymic references, showing acquaintance with all the earlier authors; it is not illustrated. Ochsenheimer only lived long enough to deal with the Rhopalocera, Sphinges and Bombyces. After his death the completion of the work was undertaken by his friend Frederick Treitschke, business manager of the Court Theatre at Vienna. His first volume was published in 1825, but the work was not finished till 1835, the last volume consisting chiefly of supplementary notes to the earlier volumes, but containing also a systematic catalogue of the whole European lepidoptera. In Augsburg, between 1828 and 1858, Freyer published a series of coloured plates, with accompanying letterpress, of a good many lepidoptera. In Ratisbon, Dr. Herrich-Schäffer, a keen practical collector, occupied what time he could spare from a busy medical practice in preparing a work on the same lines as that of Hübner, to which it is a sort of supplement. This is in six volumes, and contains 672 coloured plates, many of them by Geyer, which are worthy of a place by the side of those of Hübner, and deal very largely with varieties. The work was published in parts, the first of which appeared in 1843, the last in 1856. So far as trivial nomenclature is concerned, the later German authors, whom we have now passed in review, fall into line with their French contemporaries, taking Hübner as their guide, and at this time nomenclature was in a fairly settled condition. Now, however, in the land of Luther appeared the nomenclature reformer in the person of Dr. Otto Staudinger of Dresden, who seems to have been the first to make the attempt resolutely to apply the "law of priority." Dr. Staudinger is a thoroughly practical entomologist, and has made himself personally acquainted with the fauna of widely separated countries. In 1861 he published, in connection with Dr. Wocke, a physician of Wratislaw, a catalogue of European lepidoptera, which obtained a very favourable reception. Mr. Stainton strongly commends it in the *Intelligencer*. Mr. Kirby follows it in 1862, and even a French entomologist adopts its nomenclature so early as 1868. In 1871, a second edition was produced, and it was upon this that Mr. South founded his *Entomologist Synonymic List*. This second edition is much more elaborate than the first, and contains a list of synonymic references, which is about as complete as possible, and which is only rivalled by Godart's list of butterflies in the *Encyclopédie Methodique*, and by Stephens' and Kirby's works to which I shall allude later on. In the preface, Staudinger

formulates the principles by which alone, in his judgment, nomenclature can be established on a settled basis; these are in the main those set forth by the British Association in 1842. There is a good deal of difference between the 1861 names and those of 1871; this is chiefly due to the fact that in the earlier edition Staudinger still considered the *Vienna Catalogue* entitled to rank for priority, while in the later edition he to a large extent throws it overboard. Staudinger's nomenclature, as set forth in this 1871 *Catalog*, has been very generally adopted everywhere, except in this country, and even British authors like Lang, Kirby and Kane, when they are dealing with the lepidoptera of Europe, abide by it.

Coming back once more to our own country we find as immediate successors, and in part contemporaries, of Adrian Haworth two men who were vehement rivals—John Curtis and James Francis Stephens. Curtis was educated for the law, but at an early period of his life turned aside to entomology, to which he entirely devoted his energies. He became a skilful draughtsman and engraver, and furnished the illustrations for several works besides his own. During the latter part of his life he lived in Islington. In 1824 he began the publication in monthly numbers of a series of coloured figures, with accompanying letterpress, of the rarer indigenous species of the Class Insecta, not arranged in any systematic order, but as the material came to hand. This work, which extended to 16 annual volumes, is one of considerable merit; the figures are in the main faithful to nature, and the accompanying letterpress reveals a considerable acquaintance with earlier literature. Stephens, who was a clerk in the Admiralty, and who lived at Eltham, commenced a similar work on May 1st, 1827. This differs from the other in being arranged systematically; the portion relating to lepidoptera is in four volumes, the first of which appeared in 1828, the second and third in 1829; and the fourth in 1834, a supplement bearing date 1846. In addition to these works, each of the rivals produced a *Catalogue*. That of Stephens was the more complete, and contains copious, exact, synonymic references, showing an acquaintance with the more prominent of the earlier authors. The exact date of the first appearance of these *Catalogues* is not free from doubt, but we may place it approximately at the end of 1829, that of Curtis being probably the earlier; Stephens published a second edition of his *Catalogue* in 1833, and Curtis followed suit in 1837; and in the respective prefaces each maintains his right to be considered the more reliable authority in a fashion that has not yet become quite obsolete. A striking characteristic of each of these men, of Stephens in particular, is the readiness with which they raised to the rank of named species, forms which we now know to be only varieties. So far as trivial nomenclature goes, there is not a great amount of difference between them, both practically base their nomenclature on the *Vienna Catalogue* and Hübner. Neither had any knowledge of the Continental collections and, as they frequently failed to identify their insects by the figures or descriptions of Continental authors, it came about that new names were given by them to many species differing from those in use abroad. In 1843 Henry Doubleday paid a visit to Paris, made the acquaintance of Boisduval and Guenée, and found, on comparing some of our insects with the specimens in the splendid collection of M. Pierret, that species known by one name here, were called by another name there. On

his return, yielding much against his inclination to the urgent pressure of his intimate friend Newman, he set to work to thoroughly examine our nomenclature, with a view to bringing it into accord with that in use in France. The result was the first edition of his *Synonymic List*, which was completed in 1850, and was based—so Stephens tells us—upon the 1840 edition of Boisduval's *Index Methodicus*. The reform effected was highly unpalatable to many of the older entomologists, but the *List* gradually laid hold of English workers until it became the standard authority in this country. In 1859 a second edition was published, in which a good many alterations—due to the influence of Guenée—were made; and this was followed in 1865 by a *Supplement*. By this time Doubleday had become acquainted with Staudinger's *Catalogue* of 1861, and substituted some of the names adopted in that work for those used by himself in 1859. Newman, whose well-known work was commenced in 1867, and completed early in 1871, adopts these names; we note *epiphron* for *cassiope*, *medea* for *blandina*, *medon* for *agestis*, *icarus* for *alexis*, *malva* for *alveolus*, *isogrammata* for *haworthiata*, &c. In 1871, the same year that Staudinger's second edition saw the light, Mr. W. F. Kirby—then in Dublin, but now in the Natural History Museum at South Kensington—who had been working at the question of nomenclature on his own account, produced *A Synonymic List of European Rhopalocera*, a work well worthy to rank with Staudinger's second edition. He accepts to the full the law of priority, but differs from Staudinger in some of the details of its application; in particular, giving a much greater authoritative value to the *Vienna Catalogue*. This work was the subject of a crushing review in the *Zoologist* by Newman, in which he expends the vials of his wrath on the "law of priority," and all its supporters; six months later he renews the assault in a review of a pamphlet on the subject by Mr. Lewis, but strangely winds up the latter article with these words, "We must by some law dispose of one of two names. If 'priority' be not that 'law,' what is?" At the end of last year (1892) Mr. Kirby published the first vol. of a similar work dealing with the *Heterocera*. In 1873, Doubleday produced a final supplement to his list, in which the earlier one of 1865 was incorporated. This, however, has never been much followed. Finally, in 1884, appeared the *Entomologist Synonymic List* by Mr. South. This, so far as trivial nomenclature goes, is, for the Macro-lepidoptera, an almost exact reproduction of that adopted by Staudinger, only nine names being essentially different; additional synonyms of British authors—with whom Staudinger confesses himself imperfectly acquainted—are, however, added. As regards the Micro-lepidoptera, Wocke's nomenclature is not so closely followed, the Editor having considered it in the light of the researches made by English workers like Barrett and Stainton. It must be mentioned that Staudinger's classification and arrangement are not reproduced by Mr. South, who prefers to take that of Boisduval and Guenée, reproduced by Doubleday, as his basis, altering it as little as possible. Of Macro-lepidoptera, 165 of Doubleday's trivial names are replaced by others; in some cases, as *parallelaria* and *virgularia*, the change is a return to the names used by Doubleday in his first edition. The changes are in the main due, 1st, to the more rigorous application by Staudinger of the "law of priority;" 2nd, to the resuscitation by Staudinger of Hufnagel and Rottemburg; 3rd, to the extent to which Staudinger rejects the authority of the *Vienna Catalogue*; the

latter being, probably, the most influential factor of all. It may be interesting to trace the application of these principles in two or three illustrative examples taken from our butterflies. *Lycena alsus* is an illustration of the first of them. *Alsus* is a *Vienna Catalogue* name, (1776.) The insect is described under that name by Fabricius, in 1787, and has generally received the same name from succeeding authors. Fuessli, however, a bookseller and publisher of Zurich, had accurately described the insect in 1775 under the name of *minimus* in a *Catalogue of Swiss insects*, and Esper adopts this name, which is indubitably the earlier of the two, and is quoted as a synonym by Haworth. *Hesperia linea* illustrates the resuscitation of Hufnagel. *Linea* is also a *Vienna Catalogue* name, vouched for by Fabricius, and adopted by Hübner and later writers. Hufnagel, however, had described the insect imperfectly in 1766 under the name of *thauamas*, but Rottemburg, in 1775, by his notes, makes the identification certain. Esper and Borkhausen adopt Hufnagel's name, which is also used by Lewin, in 1795, and was known to Haworth. There is some doubt whether Poda had not described the same insect under the name of *sylvestris*, in 1761. Fabricius, Esper, and Rottemburg were of that opinion, but the description is hardly full enough for identification, and neither Staudinger nor Kirby accept it. *Lycena adonis* furnishes an illustration of the resuscitation of Rottemburg, and also an instance where Kirby and Staudinger differ. *Adonis* is another *Vienna Catalogue* name. Hübner figures the insect under this name, and later authors follow him in using it. Rottemburg, in 1775, describes the insect under the name of *bellargus*, and says it occurs in the beginning of June, and is followed in his use of this name by Esper, Borkhausen and Staudinger. Rottemburg, however, places next before *bellargus* an insect which he names *thetis*, and which he says occurs in August. His description of the male seems really to be a description of those forms of the female *adonis* in which there is a predominance of the male coloration, and of the female is that of a typical *adonis*. Kirby adopts this name for the species, but *bellargus* seems to have the juster claim as being an undoubted description of a typical male. *Erebia blandina* affords an illustration of the rejection by Staudinger of the *Vienna Catalogue*, and is another instance where he and Kirby differ. Fabricius described in 1787, under the name of *blandina*, an insect which he had seen in Schiffermüller's cabinet, under the name of *medea*. He did not adopt the *Vienna Catalogue* name because he had used that for another butterfly in 1775. *Blandina* was adopted by the French authors, and by Curtis, Stephens and Doubleday. The *Vienna Catalogue* name, *medea*, is used by Hübner, Ochsenheimer, Freyer, Staudinger in his first edition, Doubleday in his *Supplement*, and Newman. Esper describes and figures the insect under the name of *æthiops* in 1777. Staudinger, considering that the *Vienna Catalogue* contains nothing that will suffice for identification, takes the next earliest name, *æthiops*. Kirby, probably considering that the testimony of Fabricius as to identity of the insect called *medea* in S.V. is sufficient, adopts that name. *Lycena agestis* affords an illustration of the difficulties sometimes encountered in attempting to apply the "law of priority." *Agestis* is a *Vienna Catalogue* name, but the insect so named had a light, fiery blue male. Hübner figured the insect correctly under the same name, and was followed by the later authors. Lewin, followed by Haworth, called it *idas*, thinking it was identical with the insect so named by Linnæus, which was an error. Hufnagel in 1766 described

under the name of *medon* an insect which has been supposed to be the same, but his description is unverifiable. Rottemburg, alluding to Hufnagel's *medon*, expresses doubt whether it is not a variety of an insect, which he afterwards describes under the name of *alexis*. It is, however, doubtful whether Rottemburg's *alexis* is anything more than the female of *bellargus*, which he did not know, or did not recognise. Esper, under the name of *medon*, figures first an insect the size of *icarus*, dark brown with blue nervures, which is certainly not *agestis*, as we know it. In a later plate, however, as a variety of *medon*, he figures a typical ♀ *agestis* and Borkhausen adopts this name. Doubleday accepted it in his *Supplement* of 1865, and Newman adopts it. Staudinger, however, rejects the name because it had been used for another insect by Clerck, in 1759, and claims priority for Bergstraesser, Rector of the evangelical Lutheran Latin school in Hainault, who correctly figured and described the insect in 1779, under the name of *astrarche*. Kirby, however, goes further back still, and calls attention to what is undoubtedly the fact, that Scopoli, in 1763, had most accurately described the insect under the name of *alexis*. The insect described two years earlier by Poda may be the same, but this is doubtful. If, therefore, the "law of priority" is to be strictly applied, we must, with Kirby, call the insect *alexis*, the insect at present called by that name having undoubtedly to take in its place the earlier *icarus* of Rottemburg.

Having now dealt with trivial nomenclature in the past and present, I turn, if your patience is not exhausted, to the future. Stainton, in a paper read to the Entomological Society in 1849, well says:—"In nomenclature it is of the greatest importance that entomologists be unanimous, for if each one chose to call an insect by a different name, and persist in so calling it, endless confusion must arise." At present, the nomenclature of Staudinger commands a greater amount of support than any other, and English workers can best bring themselves into line with their brethren by adopting the English version of that nomenclature provided for them by South. But the time has, I think, come when a standard trivial nomenclature should be agreed upon, which should undergo no further alteration, save such as may be rendered necessary by changing views as to what forms are or are not entitled to specific rank. It is, I think, quite hopeless to look for the establishment in the near future, if ever, of an unalterable standard of generic nomenclature, because generic nomenclature is so intimately connected with classification, and upon this subject our views will be likely to change with increasing knowledge, and moreover it is a subject upon which there will always be room for legitimate differences of opinion. The fixation of trivial nomenclature, however, is not attended with these difficulties, and we have, I think, abundant material for the purpose. The only difficulty that will arise of a serious nature will be to determine the basis upon which the standard should be founded. I have come to the conclusion that the "law of priority" cannot form that basis. The differing results arrived at by Staudinger and Kirby, both zealously seeking to carry out that law, the varying opinions held as to the validity of some of the earlier authorities, and the imperfection of the descriptions of many even of the generally admitted authorities, Linnæus not excepted, suggest strongly that a new point of departure must be taken, and that can, I believe, be found in Hübner. He dealt

with so many species, and his figures are on the whole so accurate, that a nomenclature based on his, will rest upon a sure foundation of identification. The rival denouncers of Hufnagel and the *Vienna Catalogue* will have no further use for their weapons, and to a very large extent nomenclature will be brought back to what it was alike in Germany, France and this country before Staudinger descended and troubled the waters. With regard to species not dealt with by Hübner, the "law of priority" may be so far adopted that the earliest post-Hübnerian name may be accepted, and the materials will be sufficiently ample to prevent any great difficulty in arriving at a determination. The work of formulating such a standard nomenclature cannot rest on any single individual. It must be the result of agreement, perhaps compromise, between competent students in many parts of the world. This country possesses in Kirby a man who would be its very fitting representative, and there are many competent entomologists to whom he might turn for consultation in difficult cases. In Germany, Staudinger stands out as the man qualified for the task, and probably other countries could furnish fitting representatives. We have the material then, and the men to use it, but have we got the money too? Aye, there's the rub. One might reasonably look to the Government to furnish the, to it, relatively small amount needful, but I fear this is Utopian. Will the British Association, which once before took the lead in this matter, do it again? I fear our leading Entomological Society can hardly be hopefully looked to, to take its fitting place in such an enterprise, but failing all these, will not our wealthy entomologists, who are ready to give high prices for rare insects, come to the rescue and do themselves lasting honour by furnishing the means for placing the trivial nomenclature of entomology upon a fixed and settled basis?

Mr. Tutt said that it was impossible to criticise at length Dr. Buckell's paper, but two or three points occurred to him. Dr. Buckell had referred to the fact that Schiffermüller's collection names had been verified by various authors, and that, therefore, they ought to stand, but what certainty had we that the insects had not been changed, as was often done, and as it was clear had also been done in the Linnæan collection. It was very desirable that no name should be admitted unless there was some description or figure with a name. He, therefore, considered Staudinger's practice a good one. Besides, Dr. Buckell seemed to have lost sight of the fact that wherever there was the slightest clue to the *Vienna Catalogue* species, Staudinger had utilised them. With regard to Hufnagel the case was different; Rottemburg simply extended and explained descriptions already in existence, a method often adopted by modern authors themselves. The two cases were in no way, therefore, so parallel as Dr. Buckell suggested. With regard to taking Hübner as a starting point, Mr. Tutt doubted whether it would not make confusion worse confounded, and instead of the occasional raking up of an odd name by students, a whole army of Hübner's names which are now used as synonyms would become primary names. He concluded it would be much better to form a list based on those of Staudinger and Kirby, dealing simply with those names about which there is distinct difference of opinion.

A further discussion followed, after which a hearty vote of thanks was accorded to Dr. Buckell for his paper.—A. U. BATTLEY and J. A. SIMES, *Hon. Secs.*

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MELANOCHROISM IN BRITISH LEPIDOPTERA.*

AN ANSWER TO MR. ROBSON'S CRITICISM, "IS MOISTURE THE CAUSE OF MELANISM?"

By J. W. TUTT, F.E.S.

It is difficult to deal with Mr. Robson's paper, "Is Moisture the Cause of Melanism?" read before the City of London Ent. Society on Feb. 21st last, without going into considerable detail, without going over ground already repeatedly trodden, and finally, without taking too serious notice of a paper which contains no single item on the subject which has not been thoroughly discussed before.

Some little time ago it will be in your recollection, I published a pamphlet on *Melanism and Melanochroism in British Lepidoptera*, in which I summarised the various articles written by more or less competent students of lepidoptera, and criticised the various suggestions as to its cause which had been offered. Mr. Robson's paper briefly passes in review a few of these summarised papers, and then goes on to criticise at length one view that I brought forward, *viz.*, the connection between moisture and melanism. In my pamphlet I proved conclusively that areas, which were excessively humid, and those that had by recent artificial change of environment, produced dark surfaces, &c. (such being frequently increased by rain), also produced melanic races of certain species, and these, I considered, essentially due to three things, (1) the action of the moisture constitutionally on the larva; (2) the darkening of the surfaces by rain, smoke (or both combined), etc.; (3) the general action of "natural selection."

To begin with, the title of Mr. Robson's paper is essentially misleading as a criticism. If he had written "Is moisture a cause of melanism?" we might have obtained some useful result, but "*the cause*" obviously shuts out all other considerations, and at once levels the paper to a *reductio ad absurdum*.

I will now consider a few of the points touched upon. Mr. Robson begins by the effusive praise of a paper of Mr. Birchall which was written in 1876, and which made some comprehensive generalisations without working out or even suggesting any reason which could be acted on by scientific men. Dr. White seems to have been the only

* Paper read before the City of London Entomological Society, May 2nd, 1893.

man who got near a comprehension of the subject at that time. To say that Mr. Birchall's paper "comprises almost everything that has since been written on the subject," is an opinion ridiculous in itself, and can only be meant to throw dust in the eyes of those entomologists who are not scientific, and is disproved by Mr. Robson's own paper, since he finds something else to write about. Such a statement of such a paper is not likely nowadays to pass muster with men who read and think for themselves, and who begin now where the entomologists of twenty or thirty years ago left off. Even Mr. Robson says of Mr. Birchall's paper, in his next paragraph, that "many points briefly touched on by Mr. Birchall were afterwards discussed at length."

Mr. Robson refers in a very strange manner to certain remarks made by Mr. Dobrée (D'Obreè of Mr. R.'s paper), in which he showed that the *NOCTUÆ* of high latitudes were not necessarily melanic. He says that Mr. Dobrée "is a student of *NOCTUÆ* only, and that no conclusion based on the study of an entire Order could be upset by one portion of such Order." But where, I would ask Mr. Robson, can melanism be so well studied as among the *NOCTUÆ*? For every example of melanism in the other groups of *Lepidoptera*, *NOCTUÆ* give a dozen. In fact, it is only among this family that sufficient material can be gathered for generalisation, the examples among the *GEOMETRÆ* being much more limited (as might be expected from their general habits and the action of "natural selection"), and, with very few exceptions, limited to those species whose habit it is to rest on tree trunks, fences and similar places.

Mr. Robson's reference to Lord Walsingham's paper, which has been discussed at length previously, is unfair to its author, since Lord Walsingham had already withdrawn his statement "that melanic forms were characteristic of high latitudes," and has substituted "suffused forms" (*Trans. Ent. Soc. Lond.*, 1890, pp. liv.-lv.), and it appears to be begging the question, so far as Mr. Robson is concerned, to repeat the statement. Lord Walsingham's paper simply shows that dark coloration may be an advantage to the insects possessing it in high latitudes and altitudes, but it does not attempt to show the cause of melanism, which is what we have to deal with.

With regard to the other notes referred to by Mr. Robson, that referred to by Mr. Cockerell supports my view, but that of Mr. Dale (*Brit. Nat.*, p. 65), is really not deserving criticism. Really, it is difficult to get down to the level of a man who denies the primary laws of physics.

Now, with regard to Mr. Robson's remarks on my own pamphlet, I must begin by thanking that gentleman for his kind intimation to the entomological public that the pamphlet has attracted a good deal of attention, although his way of announcing the fact certainly leaves something to be desired. His reference to the early part of my papers as "a clearly-defined and intelligible theory," leads me to suggest that so long as I was only explaining the very elementary facts connected with melanism, Mr. Robson was able to follow them, but when I went off into the secondary and more indirect causes bearing on the subject, which required a more complete grasp of general scientific principles, my theory becomes "dim and obscure," and "so many side issues are raised and discussed that the original idea is almost, if not entirely, lost sight of." That is, I presume, Mr. Robson wanted something very straightforward to be presented to him, something that would be easier

to criticise, and this was managed so long as I kept within the confines presented by an elementary, physical geography text-book, but when I get beyond these limits, the paper becomes "dim and obscure" to Mr. Robson. But even in physical geography Mr. Robson is behind the times, for he talks of the increased humidity caused by the Gulf Stream as "assumed." This is a matter of fact, not assumption. His knowledge, too, of the distribution of melanic forms in Britain is shaky, for he speaks of my "attempting to show that these are the districts where melanism most prevails." This, again, is a matter of fact, and not of attempt.

If Mr. Robson had understood what I had written on the subject, he would not have given me credit for restricting nature's action to such narrow lines as he does. The breadth of my views, and the consideration of possible contingencies, seem to be the great blot in the paper, according to my critic. I pointed out broadly, that where there was excessive moisture, or excessive smoke, or both combined, rock-resting, and tree-frequenting species, became melanic. This form of melanism, I considered due to two things: (1) Moisture (or smoke, or both combined), which, in some way, acted physiologically on the larvæ, affecting them in such a manner, as to make the species vary in a general way; (2) "Natural selection," which selected the dark forms produced by the general variation, and formed a race, suitable by constitution, to its environment. I still suppose "moisture" is the great factor in inducing or producing the primary physical change in the larvæ, in Britain (although many other causes may have a similar effect elsewhere), resulting in this instance, in a melanotic development, and nothing as yet has been urged against this opinion. On the contrary, it seems to have been very generally accepted. With regard to this, I might perhaps go a step further, and point out, that although the final result of the action of moisture and smoke is much the same, the effect has been rather different. Moisture has acted slowly through ages on the constitution of the larva, and has thus brought about a certain amount of general variation; the secondary action of moisture, due to "natural selection," has likewise been slow, but always in the direction of melanism, by selecting the dark forms (or races) most protected by darker environment, brought about by the moisture, as shown by Dr. Chapman and myself. The action of smoke has been rapid, because it is practically a new phase of environment. It also, as an unusual factor, has acted on the constitution of the larva, and produced change and variation. But it also, similarly to moisture, acts in a secondary way, and also in the direction of darkening objects, but its area is more generally limited to tree-trunks, fences, walls, &c., in the comparative near vicinity of its production. Indirectly, therefore, the force of "natural selection" has again cleared out the paler, and protected the darker forms. Hence we see, that the artificial, so to speak, environment, has with "natural selection" produced a much more rapid, and sometimes, especially when aided by rain, a more complete change in a shorter period, than has the natural environment in an incomparably longer time.

Mr. Robson further writes:—"In our fens and bogs, our wet moors and mosses, we would surely find some evidence in support of this theory, if it were true." Has Mr. Robson so little knowledge of the insects from these localities, or, so little material in his collection, to suppose that such localities do not give numbers of insects which support this

theory? If he will show me a collection of insects made on any of our large bogs, I will guarantee to show him any number of species proving my point. He complains that I "argue from a special case, and assume that the reply has a general application." I assume nothing of the kind. I certainly argued that there was a large class of pale coloured species belonging to very different groups of lepidoptera, which had a very similar facies, such facies undoubtedly being entirely governed by "natural selection." Mr. Robson jumps to the conclusion that *Macrogaster arundinis*, *Laelia cænosa*, *Lithosia muscerda*, *Collix sparsata*, the genus *Chilo*, have very different habits from the *Leucanidæ*, and yet, all are "of ochreous tints, which certainly is the prevailing hue in the species that inhabit our swamps and morasses." I am quite certain that Mr. Robson is here floundering out of his depth, that he knows nothing whatever of the habits of *M. arundinis*, *L. cænosa*, *L. muscerda*, and the genus *Chilo*, and that he has no conception of the range of variation in these species. I believe he has never seen one of these species in a state of nature. I have seen them all but *L. cænosa*, so I can safely leave the entomological public to judge of the value of our respective opinions. Granting that a certain percentage of the Fen (not bog) species are pale in tint, what I wrote is still applicable to these as a group. Mr. Robson appears to fail to grasp what I have written. His failure to see the fact that "natural selection" is in such districts, and under the conditions of existence of these species, acting in direct opposition to the production of melanic forms is unfortunate, but I see no immediate remedy. To say that I "have lost the thread of my argument," because I have got rather out of the line he could understand, is rather amusing. I import another factor, *viz.* "smoke," says Mr. Robson, in dealing with the modification shown by marsh-frequenting species, near large towns. Certainly! I am sorry Mr. Robson cannot compound the three probabilities here referred to (moisture, smoke, and natural selection), but it would apparently be waste of time to explain the matter further.

Mr. Robson unwittingly proves in his reference to *L. pallens*, my compounded notion with regard to this species. (1) *L. pallens*, when it inhabits very wet places, should have a tendency to be dark; (2) *L. pallens*, in marshy places, rests on grasses and reeds, therefore "natural selection" causes it to respond to its environment, and makes it pale; (3) The reed-beds, sedges, grasses, &c., near large, smoky areas, get dark, and "natural selection" at once steps in, and darkens the form produced by 2, the natural tendency to vary being inherent by 1. Mr. Robson fails to compound these, and hence, I have "consciously, or unconsciously, changed my opinion," and "have lost the thread of my argument." Mr. Robson, of course, finds it much easier to suppose this, than that he is at fault and failed to understand my argument.

The little care which Mr. Robson evidently has bestowed on a subject which he treats with the utmost confidence, whilst other entomologists have to view it from a distance, is evidenced when he, wishing to prove his imaginary idea that I had changed my views, does it by quoting the following statement:—"But if moisture is to be taken as a direct, rather than as an indirect cause, we should expect to find melanic variation occurring in the swamps of Tropical Africa, in the Forests of the Amazon, on the banks of the Mississippi, and in many other damp climates, even within tropical regions, and I am not aware that this is the case." This is a statement made by Lord Walsingham, in his Presi-

dential address to the Fellows of the Entomological Society of London, in 1890, and not mine at all. I am credited with it, it is quoted at length, my views have been changed according to Mr. Robson (because, I suppose, Lord Walsingham made this statement), and my ideas are ridiculed. Why? Because Mr. Robson really does not pay enough attention to the subject he attempts to criticise, and mixes up the ideas of different people, in this marvellous fashion. Surely this is sufficient to lead thoughtful entomologists to put Mr. Robson's criticism down as a most valuable one, which should be relegated to a work entitled *Fairy Tales for the Ignorant*. Surely a subject which needs the greatest care, and a rather large amount of general scientific knowledge, should be handled by one who shows the first, and possesses the other.

With regard to my remarks as to the supposed effect of the actinic rays of the sun, the statement that I should not be inclined "to give the action of the sunlight the short shrift I gave it in a previous paragraph," does not bear in any sense the construction Mr. Robson puts on it. I attempted to collect and criticise the various views put forward to account for the phenomenon. The suggestions of Lord Walsingham presented this view in a new light, and I was quite willing to discuss the matter, although previously it had not appeared to me to be of sufficient gravity to be worth discussion. I decided in my criticism against the probability of it having any value, and Messrs. Poulton and Merrifield have since conducted experiments tending to strengthen the position I took up.

Mr. Robson then goes off at a tangent, and criticises the possibility of moisture producing dark varieties. Here, again, he fails in elementary principles. I would again repeat that (1) Moisture may so affect larvæ that they are physically changed to suit an environment = direct action (in supposed area towards melanism); (2) Moisture may so darken objects as to increase the power of "natural selection" = indirect action (in supposed area towards melanism). Here is a compound action of moisture, the units of which Mr. Robson fails to discriminate.

Mr. Robson's further remarks, in which he refers to "an inclination to retreat from the very decided views," &c., are really a product of his own imagination. Unfortunately, he views his science from a very narrow standpoint, hedged on both sides most carefully to prevent wandering. Observation has taught me that Nature has no such method in any of her moods. Variation is her great point, and the means by which this is brought about are various. To give my readers a distinct idea of what I consider one potent and active force, I discussed the action of moisture at length, because it is that force which most intimately concerns British lepidopterists. At the same time, I went into such other side views that Nature takes—temperature, heredity, environment, natural selection, etc.—partly to show that I knew such existed, but more particularly because it is impossible to discuss one view without considering others. These are the symptoms of mental aberration, I suppose, to which Mr. Robson casually refers on every other page.

Mr. Robson quotes Dr. Chapman as saying that he considered melanism to be "a western rather than a northern form of variation; to be associated with wet weather rather than a cold climate; and it has certainly been most common of recent years, which may be

attributed to the long succession (unprecedented) of wet seasons we have passed through," and yet goes on to conclude (from this, I presume) that "Dr. Chapman, who is one of the most thoughtful and original of all students of Lepidoptera, does not support the idea that moisture produces melanism." Truly, these depths are beyond me. The quotation Mr. Robson gives appears to be a sufficient refutation of his own conclusion. Mr. Robson clearly does not discriminate between the two effects of moisture, the effect "that selects varieties" and the effect "that makes them." So far as we have been able to get at the latter, Dr. Chapman's notes (*Melanism and Melanochroism in British Lepidoptera*, pp. 60-64) are lucid enough. Mr. Robson seems to have overlooked them, or not to have noticed that they deal with the matter.

Some of the odds and ends of Mr. Robson's paper are most startling. Mr. Robson's want of knowledge of the rainfall of our Fen districts, of the response to environment of our Fen species, of the influence of the Gulf Stream on the meteorology of the British Isles generally, and of certain parts in particular, leads one to suggest that there are still a few books on meteorology and physical geography to be obtained in some of the various libraries scattered over the country. He also states, too, that "these melanic forms did not exist half a century ago." What melanic forms? I would ask. The melanic forms of *Gnophos obscurata* on the peat bogs of the New Forest or on the dark rocks of Perth; the black *Xylophasia polyodon* of the Irish coast, Scotland, etc.; the black *Agrotis lucerneae* of the Kincardineshire and the Irish coasts; the dark *barrettii* form of *Dianthæcia luteago* or the *manani* form of *D. cossia*; the dark Scotch forms of *Larentia cæsiata*, or the black moorland forms of *Hypsipetes elutata*; the Scotch *plumbata* form of *Melanthia rubiginata*, the dark Wicken form of *Acidalia bisetata*, or the Dartmoor form of *A. marginepunctata*; the Wicken black var. of *Chilo phragmitellus*, and endless others? If he say so, I am certain he stands alone, and the statement would be laughed at by every scientific lepidopterist in the country, and I would suggest a re-reading of *Melanism and Melanochroism*, &c., pp. 42-43, and reference to elementary text-books on the areas in Britain which used to be covered with forest lands. On the other hand, if he refers to *Amphidasys betularia* var. *doubledayaria*, to *Polia chi* var. *suffusa*, to *Cuspidia psi* var. *suffusa*, or *Eupithecia rectangulata* var. *nigrosericeata*, I should be inclined to agree with him, as the present conditions of environment were so different then from what they now are; but ages before that, when the physical geography of England was somewhat different from now, when large forests were the rule, dark forms probably existed, and the species have simply reverted by a series of changed conditions in their environment in recent years.

But what new facts does Mr. Robson give us relating to melanism? Not one that has not been noticed before. What new theory does Mr. Robson bring forward to replace the ideas he vainly tries to overthrow? None! Not one single original idea of any description. He certainly offers a warmed-up, second-hand edition of Lord Walsingham's theory, from which the latter has more than half withdrawn. "Absence of sunlight!" This, then, accounts for the effusive praise given to Mr. Birchall's elementary paper of so many years ago. That gentleman casually mentioned that "the clouds in Ireland" and "the smoke in Lancashire" intercepted some of the sunlight, and this accounts for

Mr. Robson's appraisalment of Mr. Birchall's intellect. Further, one might think that Lord Walsingham was the best man to elaborate a theory of his own. The paper on which Mr. Robson's hopes of salvation are based I have already criticised, and Lord Walsingham himself says:—"Mr. Tutt, referring to a paper of my own, in which I called attention to the tendency to melanism exhibited by Arctic and Alpine Lepidoptera, points out that insects from high latitudes are not generally melanic. I think I may at once admit that I had used the term 'melanic' somewhat incorrectly in this connection; what I desired to point out was the general tendency of Arctic Lepidoptera to a certain suffusion of markings, and to an increase in the proportion of dull or dingy scales, calculated more rapidly to absorb heat than the purer white of more southern varieties. Such a tendency will, I think, be admitted to exist, but I am aware it is far more conspicuous in many insular and Alpine districts; and, while I cannot agree that the arguments put forward in that paper are in any way undermined by this admission, or that the advantage secured to the species by the development of colour capable of rapidly absorbing heat has been in any way disproved, I am quite willing to accept Mr. Tutt's assertion that melanism does not habitually occur unless lower temperature is accompanied by increased humidity: qualifying the acceptance only by suggesting that anything which would have the same effect as increased humidity in diminishing the action of sunlight would probably be found to produce the same results." The advantage of a dark coloration may, in a small degree, be admitted, although the active character of the absorbing influence of the wings is not at all clear or proven, but we have to deal with the origin of such dark coloration. This idea of Lord Walsingham's I criticised at the time (*Ent. Record*, vol. ii., pp. 3-4), as well as his elaboration of the idea that partially intercepted sunlight, was probably a cause of melanism. It is useless to travel over the ground again, until some new facts can be brought to support the idea, and this, I venture to state, will probably never be done. Lord Walsingham also suggested experiments to be carried out on these lines, by Messrs. Poulton and Merrifield. Both these gentlemen conducted experiments (recorded in the *Trans. of the Ent. Society of Lond.* for 1892), and they resulted in failure, so far as they went, and fully bore out my prophecy that there was no effect in this direction. Mr. Robson appears to have clutched at the point on which I publicly expressed my ignorance and want of knowledge, as the best means of attacking my paper, but I am afraid that he has proved to the hilt, that his own ignorance equals, or even excels, my own.

The puzzles of Mr. Robson are amusing. Mr. Barrett mentions a tendency to dark variation, and associates it with moisture, but this puzzles him, because Mr. Barrett mentions the "blue sky and bright sunshine of Pembroke;" so also does the pure air and bright sunshine of parts of Scotland, for Mr. Birchall says, that in some of these melanic-producing districts "the air is purity, and the sunshine brightness;" he is puzzled at the sunlessness of Ireland and the Isle of Man, and the want of influence of the Gulf Stream on the coast of France. In fact, many things puzzle Mr. Robson, but these he nobly leaves to the meteorologists of Ireland. "Sufficient unto the day is the evil thereof," and Mr. Robson showed his evident pleasure when he reached the end of his paper, probably at having pulled through a task which he set himself

thoughtlessly, stated his intention of doing publicly, and which he carried through nobly for the sake of his prestige. But it was a forlorn hope, and Mr. Robson's attack on *moisture* only shows, that it has nearly drowned him, that he has a lot of meteorological and biological books to read, and that the modern critic sometimes has a tendency to criticise what he does not understand, and, as a result, has to find fault with the aberrant intellect of the writer.

But if this criticism be not a personal attack, I would ask Mr. Robson for a few facts, which any article meant to be a contribution to science would have contained, and which it was Mr. Robson's duty to have found out by experiment. (1) What percentage of the sun's rays are absorbed or intercepted on the West coast of Ireland, East coast of Ireland, Isle of Man, Scotland (West and East), Shetland, Yorkshire, Derbyshire, and other areas given to producing melanism? (2) What percentage of these rays are distinctly chemical in their tendency? (3) What experiments has Mr. Robson conducted to show, that the areas where melanism prevails, do have a large percentage of the sun's rays intercepted? and will he give us one experiment that he has conducted to a successful issue, which bears out his views? If he has done none, where is the science in his paper? Is it not rather an essay, based on imagination, rather than a theory, based on facts? All these assumptions that things are so, are not science. The New Forest, where black *obscurata* occur; the coast of Kincardine, where black *lucerneae* are found; the Welsh parks, where dark *crepuscularia* occur; Delamere Forest, where black *betularia* is common; Lewes, where black *Agrotis cinerea* occur; Deal, where black *Agrotis corticea* occur, have deficient sunlight (*teste* Mr. Robson). Where are the experiments that warrant such assumptions? No, Mr. Robson! it will not do! "Natural selection" is not dead yet, and your paper has not proved that we have anyone to replace Darwin.—May 1st, 1893.

SCIENTIFIC NOTES.

SPECIFIC NOMENCLATURE.—Dr. Buckell's paper on "Specific Nomenclature" contains interesting information, and is very clearly written. The proposition to make Hübner the criterion for disputed specific titles will, however, make more difficulties than now exist. The course to be pursued seems to me that, upon each trivial name now in dispute, an opinion be drawn up by a Committee, with a statement of the facts, and a recommendation as to the adoption of one of the trivial names. Unless the facts are successfully disputed, it will eventuate that such recommendation will end by being generally accepted. The case of the disputed title of an American butterfly, *Limnitis eros*, having been brought before the N. York Ent. Club, a decision was reached which, so far as I am aware, has been since respected. The disputed titles of European species are not so many but that they might soon be settled in this way under the constructions of the "law of priority."
—A. R. GROTE, Bremen, Germany.

SECRETION BY EMERGING IMAGO OF CUCULLIA VERBASCI.—I noticed a curious fact relative to the emergence of *C. verbasci*. I had cut off the end of one cocoon to see how the pupa was progressing, and while looking at it, the skin cracked, and the moth forced its way partly out

of the pupa skin. Remaining in this position for about a minute, it exuded a liquid from a point on its head just above the trunk. This gathered into a drop, and I absorbed it twice with an old cocoon of the same species, which it seemed to render more loose in texture. May not this liquid be used for the purpose of softening the very tough cocoon? I have heard of similar cases with *Dicranura vinula*, but if I recollect rightly, the liquid was exuded from glands opening at the back of the head. *Verbasci* has a curious habit of resting with its two hind legs raised, reminding one of a mosquito when it is sucking your blood.—A. U. BATTLE, 28, Amhurst Park, London, N. March 30th, 1893.

VARIATION.

MELANISM IN DIURNÆ FAGELLA.—Last month I took a long series of *D. fagella* off the tree trunks in Highgate Woods, several of which are remarkable for their extremely dark colour, though a few are as conspicuously pale. On comparing them with two other series (1) taken in the same woods a few years ago, and (2) ancient "crusted" specimens of my younger days, I should say that the recent tendency towards melanism is distinctly marked in this species. Great care, however, is necessary in examining what appear to be "pale" specimens, as the insect, I suspect, soon loses the dark colour of its scales when exposed, without, in other respects, shewing signs of "wear." It reminds me of the so-called "varieties" of *Lasiommata megera* and *Pararge ægeria*, &c., which, I believe, are mostly bleached by the sun.—GEORGE HOLLIS, 47, Dartmouth Park Hill, N.W. April, 1893.

UNIQUE VARIETIES OF ABRAXAS GROSSULARIATA.—The two very beautiful varieties (vide Plate C., *figs.* 13 and 14) of this very abundant and well-known species, were captured in 1883 and 1884 in Barnsbury, a northern suburb of London, and not very far from "The Angel" at Islington. As will be seen at once on reference to the figures, their beauty and rarity consist in the excessive suffusion of the orange pigment, causing a very large and conspicuous orange blotch. The more beautiful one (*fig.* 14) was taken in 1883, and the other (*fig.* 13) the following season, both at rest upon the garden wall, and recently emerged, and were close to some black-currant bushes, upon which the larvæ fed. The capture of both was effected by a non-entomological acquaintance, who kindly gave them to my friend, Mr. Jas. A. Gee, from whom they passed into my possession upon Mr. Gee's relinquishing active collecting. The first was exhibited by him at the now defunct West London Ent. Society Pocket-box Exhibition, November 16th, 1883, and recorded in *The Entomologist*, vol. xvi., p. 287. After these specimens were captured the larvæ were collected in subsequent seasons and freely bred, without special success in aberration, but Mr. Gee informs me that "all had the same golden strain." Mr. Southey, of Holloway, collected 750 larvæ in 1891 from the same garden, but found that the imagines had almost lost, by that time, their distinctive "orange strain," and only about six forms emerged worth keeping, and these, strangely enough, had reverted to the other extreme type, and were nearly black.—ALBERT J. HODGES. February, 1893.

CURRENT NOTES.

Mr. McLachlan recommends arsenic as a preservative in collections of insects. A solution of arsenic in rectified alcohol is recommended. Arsenious acid or arsenite of soda may be used. The quantity of arsenic necessary is that which will just cause an appreciable deposit when evaporated on a blackened surface. The bottom of drawers or boxes may then be saturated, the alcohol evaporates, and the arsenic remains for ever and aye.

Students will hear with pleasure, that Mrs. Stainton has kindly presented the collections of her late husband to the Natural History Museum, South Kensington, together with the original drawings, made to illustrate *The Natural History of the Tineina*. The bulk of the collections are to be kept separately, under the name of the "Stainton Collection."

Mr. C. G. Barrett informs us that specimens of *retiferana*, Wocke, and *margarotana*, H.-S., were sent him last winter by Herr Hoffmann, and that the species which has recently been included in the British list under the latter name, is really the former. It appears that Herrich-Schäffer figured *margarotana*. Then Dr. Wocke sent Heinemann specimens which he thought were *margarotana*, and which the latter described as such. Subsequently Dr. Wocke bred from cones of *Pinus sylvestris*, the true *margarotana*, H.-S., and finding out the error he had fallen into, named the species described by Heinemann, *retiferana*, so that the synonymy of the species appears to be (1) *retiferana*, Wocke (= *margarotana*, Hein.). (2) *margarotana*, H.-S. The former (feeding on spruce fir) is the British species, the latter (feeding on *P. sylvestris*) is not yet known as British.

Mr. Fletcher records that last year (1892) he received living females of *Retinia duplana* from Mr. Reid. These were sleeved on a small Scotch fir; eggs were laid; the larvæ fed in the young shoots; the imagines emerging indoors, during March (1893).

Our readers will hear with regret that, owing to ill-health, Mr. T. D. A. Cockerell is leaving Jamaica, where he was only so recently appointed Curator at The Institute of Jamaica, Kingston. For the present his address is Las Cruces, New Mexico, U.S.A.

The Secretaries of the South London Ent. Soc. wish to draw attention to the fact that Excursions have been arranged for (1) June 10th, to Oxshott, Surrey, conducted by Mr. South, and (2) July 15th, to Westerham, Kent, conducted by Mr. H. J. Turner.

NOTES ON COLLECTING, Etc.

THE EARLY SEASON.—Since the middle of January we have had no really cold weather, and since the middle of February we have had scarcely a drop of rain. Hot sunny days and cloudless skies have been the rule for more than two months, and, with the exception of a few white frosts by night, after the hot days in late March, the weather has been more than summer-like. The rides in the woods are cracked more than is usual in a hot July, the vegetation is as forward as is usual in the middle of June, and insects are appearing in strange

fashion, and at ordinarily unaccountable times. The sallows were well out in February, and by the middle of March were getting past. The moths that frequent the sallows commenced about the middle of February, and continued throughout the whole of March, coming fearlessly in the bright moonlight, and occurring at early dusk after the hot days, even when radiation later in the night produced a slight frost. They were still coming during the first week of April. On the first of that month, *Pachnobia rubricosa* and *leucographa*, *Tenocampa gothica*, *gracilis*, *munda*, *cruda*, *stabilis*, *instabilis*, *Orrhodia vaccinii*, and other species appeared near Hereford, whilst the following day *Lycæna argiolus* was noticed in Dr. Chapman's garden. *Pieris rapæ* were abundant, but I had seen these repeatedly in London during the three preceding weeks. April 3rd gave us a number of *Micropteryx purpurella*, *semipurpurella* and 1 *sanguis* (?) flying over the birches, whilst large numbers of *Diurnæa fagella* were on the trees. *Lemnatothila salicella* was also taken in the doctor's garden, and by the end of the week, *Lycæna argiolus* proved to be common. Of the genus *Vanessa*, only *io* was noticed, but *Grapta c-album* was seen on the 2nd, and several at Stoke Edith on the 5th, when also *Lithocolletis faginella* occurred on the beech trunks, and a pair of *Pieris brassicæ*, in cop. were observed. On April 29th a day in North Kent showed *Pararge ægeria*, almost over, *P. megæra*, *Pieris napi*, *P. rapæ*, *P. brassicæ*, *Argynnis euphrosyne*, in greater numbers than I have noticed it for many years, *Syrichthus malvæ*, well out, together with *Chortobius pamphilus*. *Phoxopteryx lundana*, *obtusana*, *Catoptria albersana*, *C. ulicetana*, *Pardia tripunctana*, *Cnephasia musculana*, *Stigmonota perlepidana* represented the TORTRICES whilst *Psyche pulla*, *Swammerdamia pyrella*, *Micropteryx calthella*, swarms of *Tinagma seriella*, an occasional *Asychna modestella*, *Elachista rufocinerea*, *E. cygnipennella*, *Tischeria marginæa* were captured, and a number of common *Lithocolletidæ* observed. A few odd specimens of *Cidaria russata*, *C. corylata*, and *Lomaspilis marginata* were met with, and an odd larva of *Thecla v-album* came down at the first time of asking, when I tried to see if the larva was yet about. I consider this not at all a bad show, for a few hours of rather lazy observation, at this time of year. On April 30th I noticed *Stigmonota internana*, and swarms of *Catoptria ulicetana* on Blackheath. The dates of first appearances should be carefully kept this year, some will probably be record dates for the century.—J. W. TUTT. May 2nd, 1893.

Lyndhurst.—I spent a few hours at Lyndhurst on April 3rd, but without any very great results. Of the hibernated *Diurnæ*, *Gonepteryx rhamni* reigned supreme in point of numbers, the ♀s being busily engaged in ovipositing on the terminal shoots of the buckthorn, whilst the ♀♀ of *Vanessa polychloros* were frequenting the sallows with a similar object. Of the freshly-emerged species, only the commoner *Pteridæ* shewed up, except one example of *Lasiommata egeria*—rather early, I think. *Anticlea badiata* was to be taken on the fences, *Tephrosia crepuscularia* and an occasional example of *Xylocampa areola* (*lithoriza*) on various tree trunks. By beating the pines I obtained plenty of larvæ of *Thera variata* and *Ellopiæ prosapiaria* (*fasciaria*), and by way of relieving the monotony of the proceedings, an example or two of *Panolis piniperda* would fall on the tray. *Cicindela sylvatica* was very common on the wing; is not this rather early?—JAMES A. SIMES. April 20th, 1893.

Guernsey.—I left London April 19th for Guernsey, and anticipating that during my intended few days' stay, that my opportunities and inclination for collecting would be alike small, I "travelled light," from the collector's point of view. The glorious weather, however, which prevailed during my week's stay, combined with a pressing request from the Editor to procure him some larvæ of *Melitœa cinxia*, induced me to spare one afternoon to visit my usual hunting-ground, viz., "The Gouffre," where I arrived with my friend Mr. Peek about 3 p.m. on the 24th. After a drive of some miles, I was quite surprised, although prepared for curiosities in the way of early emergence, to see a fine *M. cinxia* almost as soon as we left the hotel, and this was but the introduction to them, as lower down the cliff banks we found them in fair numbers, although not nearly so plentiful as they are later in the season, and very wild and difficult to approach. Diligent search soon resulted in discovering some nearly full-fed larvæ, which were feeding singly all over their locality, and from the manner in which their food-plant, the narrow-leaved plantain, had been devoured, they must have been in great plenty. During March Mr. Peek had, in a previous visit, discovered a web full of the young larvæ, which feed early, gregariously, separating when partly grown. On the slopes, which were covered with gorse and dog-daisies, were large numbers of *Chrysophanus phloas*, *Pararge megæra*, and *Pieris rapæ* and *napi*, with a few *Lycœna icarus* and *Thecla rubi*. *Pieris brassicæ* has been common about the gardens, together with a few hibernated *Vanessas*, and I noticed two *Euchelia jacobææ* flying on the road sides. On the cliffs with the *M. cinxia* were a few *Plusia gamma* and *Aspilates citraria*, evidently to represent the Nocturæ and Geometræ respectively. Night-work I have entirely neglected, being otherwise occupied, but from the cold and heavy dews on most evenings, I do not think I have at present lost much.—ALBERT J. HODGES, Guernsey.

Colchester.—As this is such an exceptionally early season, perhaps the dates of the undermentioned captures may be worth recording, and the specimens were all captured by my father, my brother Philip, or myself:—February 19th, nine *Nyssia hispidaria*, several *Phygalia pilosaria*, and one *Pieris rapæ*; March 8th, *Andrena gynana*, *clarkella*, and *præcox*; March 9th, *Pionæa forficælis*; April 14th, *Andrena varians*; April 20th, *Euchloë cardamines*, *Argynnis euphrosyne*, and *Syrichthus alveolus*; April 22nd, *Thanaos tages* (there is only one previous record for this district); April 23rd, *Platypteryx hamula*, and *Acronycta rumicis*; April 24th, *Thecla rubi*, and *Macroglossa fuciformis*; April 25th, *Notodonta chaonia*, *Cymatophora ridens*, *Dasychira pudibunda*, *Acronycta psi*, *Pararge megæra*, *Heliodes arbuti*; April 26th, *Notodonta trepida*, and *Vanessa atalanta*; April 27th, *V. urticæ* larvæ, full fed.—BERNARD S. HARWOOD, 2, Brooklyn Villas, Colchester.

Highgate.—After the rains of February, the weather became very dry, mild, and genial. A stroll through the woods produced (off the trees), several specimens of *Hybernia leucophæaria*, *H. progemmaria*, *H. æscularia* and *Phigalia pilosaria*. Amongst them were some of the apterous or semi-apterous females. I also obtained *Biston hirtaria*, a Tortrix (*Ephippiphora argyрана*?) and *Diurnæa fagella* in abundance. I fancy that *P. pilosaria* is much commoner than it used to be in this neighbourhood, for Newman remarks that "it is not common near London, but is abundant in the North and West of England."—GEORGE HOLLIS, Dartmouth Park Hill, N.W. April, 1893.

Hereford.—April 17th, *Acronycta tridens* ♂ on tree-trunks; 23rd, hawthorn in full bloom everywhere; *Pararge megæra* and *Chortobius pamphilus*, several of each flying; *Euclidia mi.* worn; *Lycæna argiolus*, which was flying freely in March, still out. Ova of *Euchloë cardamines* found.—T. A. CHAPMAN, Firbank, Hereford.

Abbott's Wood.—April 16th.—*Syrichthys malvæ*, *Sesia culiciformis*; April 19th, *Euchloë cardamines*, *Thanaos tages*, and one *Argynnis euphrosyne*; April 21st, *A. euphrosyne*, in swarms; *Chrysophanus phlæas*, *Thecla rubi*; April 26th, *Adela viridella* (a few); *Pararge megæra*, two or three; *Macroglossa fuciformis*, *Phytometra ænea*, *Spilosoma fuliginosa*; April 28th, *Venilia maculata*, *Panagra petraria*. At about 11 o'clock, I passed an oak-bush, round which *A. viridella* were hovering in profusion, giving it quite a fairy-like appearance; at 12.15, when I passed again, not one was to be seen, though I looked carefully for them. On April 18th, I saw *Hemerophila abruptaria*, on a lamp in Eastbourne, besides numbers of *Eupithecia* and *Melanippe fluctuata*.—W. W. ESAM, Eastbourne. April 28th, 1893.

Rugeley.—The wonderful weather we have had lately, has brought out insects a month or so before their time. *Cymatophora flavicornis*, I took on the 19th February; *Larentia multistrigaria*, on the 12th March; *Brephos parthenias*, on 19th of March; *Hadena thalassina* and *Odontopera bidentata*, at light, on the 21st April; *Hadena glauca*, on the 22nd April; other captures have been *Viminia rumicis*, *Cuspidia psi*, *Tephrosia biundulata*, and *T. punctulata*; *Spilosoma menthastri*, I saw on the 28th April; *C. flavicornis*, was quite scarce this year, but *glauca* has occurred more freely than usual; the other insects in their usual numbers.—RICHARD FREEB, Rugeley, Staffordshire.

Penarth.—I have had several imagines of *Saturnia carpi*, emerge in a cage in the house (kept in a cold room), also four males and one female, in a cage in the garden, where it has been all the winter. A few *Spilosoma fuliginosa*, that I have had during the winter, have now spun up.—G. A. BIRKENHEAD. April 1st, 1893.

Winchester.—I have been to Lyndhurst for two or three days, but did not take much. Four *Eupithecia pumilata*, one *E. irriguata*, four *E. abbreviata*, one black *Tenocampa stabilis*, three *Xylina petrificata* (which will not lay), one *Amphidasys prodromaria*, and a few *Boarmia abietaria* larvae.—G. M. A. HEWETT. April 2nd, 1893.

Cornwall.—You will no doubt be inundated with "early appearances" this season, but I send the following for insertion if you think well. Locality, near Torpoint, Cornwall. April 10th, saw 1 *Lycæna argiolus*; 15th, took one, saw another; 19th, saw 2 *Argynnis euphrosyne*; 20th, saw three more; 1 *Colias edusa* was seen April 18th, near Kea, Truro, by a friend (a collector); on Saturday, April 29th, I saw many *A. euphrosyne*, and some *Hesperia alveolus* about three miles from Hatfield, Herts.—WALDEGRAVE.

Tunbridge Wells.—It may interest your readers to hear, that I saw a fine male specimen of *Euchloë cardamines* at Rusthall, near Tunbridge Wells, on Good Friday, 31st March, and my brother also saw one on the same day, near Bayham Abbey. This is at least three weeks earlier than I have seen it before.—ARTHUR J. ROSE, 6, Gracechurch Street, London, E.C.

York.—Feb. 19th was the first date that I saw *Hybernia leucophaæria*; they were numerous, but not easy to take, owing, I suppose, to

the warm day. Many flew off the trees as soon as approached, whilst several were on the wing. I took the banded form, and also the ochreous form. The species seemed getting thin and worn by the 3rd of March, but I then found on the oaks, imagines of *Asphalia flavicornis*, evidently just emerged. I consider this a very early date, my previous captures having been the last week in March and early in April.—S. WALKER, York. *March 17th*, 1893.

Durham.—On the 17th inst. I took a very light specimen of *Asphalia flavicornis* on Seamer Moor, and on the 20th, a very dark specimen, with black band, thorax and body at the same place, thus affording an example of dark and light variations in the same locality, and under apparently the same conditions; the ordinary form occurred, of course, also, but the insects were by no means plentiful this season.—T. MADDISON, South Bailey, Durham. *March 24th*, 1893.

Theydon Bois.—*Brephos parthenias* was just out on 11th March at Theydon, and last Saturday (25th) it swarmed, but wanted picking over, as some were worn. We worked the shallows on the same evening, all the common species turned up plentifully, including 45 *Tæniocampa munda*, usually rather a scarce species in our forest, and a ♀ *Calocampa exoleta*. I am trying to get ova from the latter, but fear it is not fertile.—A. U. BATTLE, 28, Amhurst Park, N. *March 30th*, 1893.

Swansea.—The shallows are nearly over here now, and the few that are left are hardly worth working, as the bright moonlight nights seem to keep the moths off. So far I have turned up 5 new species in this district since I sent a list of insects taken here last year, and which appeared in the *Record* of February. On March 12th I took 3 *Phygalia pilosaria*, one being a very nice black variety. *Larentia multistri-garia* came to the moth trap at the beginning of March. On the night of the 6th March I found a specimen of *Tæniocampa populeti* at rest on some wire netting, apparently just emerged, and have taken two or three at swallow since, and on the 28th I took 1 *Brephos parthenias* and 1 *Asphalia flavicornis* in the same birch wood. My first *Tephrosia crepuscularia* was taken on March 8th, up to the present date, about 30 being secured, some beautiful black varieties being among them, out of which I have been fortunate enough to get a couple of batches of ova. On March 25th I got two *T. biundularia* (?), one typical, and one quite black, with white line on margin. This year I have placed a label with date under each insect, to see how the *crepuscularia* and *biundularia* run into each other. About a dozen *Dasychira pudibunda* have emerged, all being typical. I was in hopes of getting some dark ones, as the larvæ were nearly black, but have been so far disappointed.—R. B. ROBERTSON, Sketty Park, Swansea. *April 1st*, 1893.

Aberdeen.—The season is remarkably early here. *Cidaria suffumata* was out on the 12th April, and I got a fair sprinkling of the var. *piceata*, but they are difficult to get really perfect. I took *Euchloe cardamines*, which is a rare butterfly in this district, on May 1st. *Macroglossa bombyliiformis* was flying wildly at the same place, and it was no easy matter to net them. *Viminia menyanthidis* and *V. myrica* turned up at sugar on April 29th, about a month earlier than usual. The nights are rather frosty, and consequently moths are not moving freely; night-feeding larvæ are apparently scarce here as yet, and not so far forward as the perfect insects.—A. HORNE. *May 5th*, 1893.

Wye Valley.—On the 18th of April, *Argynnis euphrosyne* was out

here in swarms. I also saw or took numbers of *Nisionades tages*, *Syrichthys malva*, *Polyommatus phlaeas*, *Cœnonympha pamphilus*, *Panagra petraria*, *Eubolia plumbaria*, *Ematurga atomaria*, *Euclidia glyphica*, *Venilia maculata*, *Heliaca tenebrata*, *Coremia designata*, *Iodis lactearia*, *Euclidia mi*, *Emmelesia albulata*, and *Spilosoma mendica*. On the 22nd April I took *Plusia gamma*, *Ino statice*, *Euchelia jacobææ*, *Thyatira batis*, and *Spilosoma menthastri*. On the 24th April I found nearly full-fed larvæ of *Diloba cœruleocephala*, feeding on plum and laurel, and larvæ of *Urapteryx sambucaria*, feeding on privet. A lot of *Noctua festiva* emerged in confinement last week, and I have never seen such large specimens of this species.—A. NESBITT. May 2nd, 1893.

EPHESTIA DESUETELLA (NOT KÜHNIELLA) IN JAMAICA.—In a previous number of the *Record* there appeared a notice concerning the supposed occurrence of *E. kühniella* in Jamaica. This was based on an examination of the larvæ found, which, while certainly not *interpunctella*, seemed to agree, in all respects, with those of *kühniella*. However, when the moths appeared later, they did not seem to agree well with *kühniella*, so I sent some to M. Ragonot to make sure. The reply has come that they are *Ephestia desuetella* (Walk.) = *cahiritella*, Zell. = *passulella*, Barrett.—T. D. A. COCKERELL. April 2nd, 1893.

COLEOPTERA AT WILLESDEN AND HANWELL.—Acton Lane, Willesden, is not exactly a spot to give a coleopterist any ideas as to its being a good locality for beetles, and I was considerably surprised last February to find that good insects were to be taken there, in spite its uninviting appearance. I had gone to Willesden with the idea of walking to Hanwell, and then round by Sudbury, back; but, as a matter of fact, I never got as far as Acton. The first piece of loose bark I pulled off contained a nice specimen of *Haplocnemus impressus*, so I set to work on the surrounding stumps, but although no more *Haplocnemus* turned up, I took *Scaphidema œnea* and *Rhinosinus viridipennis*, and further down the lane, in one of the adjacent fields, there was a three-forked oak stump, with a large clump of grass growing in the centre, and by shaking this I secured *Psetaphus heisei*, *Scydænus hirticollis*, *Ozypoda nigra*, *Euthia scydænoïdes*, *Trogophloeus elongatulus*, and a light coloured ♂ of *Tychus niger*, while from the fungus growing on the stump I took *Cis villosulus*.

On the following Saturday I went to Hanwell, but was not so successful, the best insects taken being *Ceuthorhynchus rugulosus*, *C. troglodytes*, *Alophus triguttatus*, *Engis rufifrons*, *Cis villosulus*, *Bembidium 4-maculatum*, *Corticaria punctulata* and *Homalota gregaria*.—H. HEASLER, 17, Danby Street, Peckham, S.E.

TROGUS LAPIDATOR, POSSIBLY BRITISH.—From one of a number of *Papilio machaon* larvæ purchased last July, I obtained a large *Ichneumon*, which was pronounced by a specialist, to whom it was sent, to be *Trogus lapidator*, with the remark that it had never been met with in English specimens of *machaon*. The dealer from whom I obtained the larvæ, said he was sure the larvæ came from Soham, as he had no *machaon* from the Continent till the autumn. Of course, I could only come to the conclusion that he might have made a mistake, but seeing in your current issue the notice of that reared by Major-Gen. Carden, I thought the incident might be worth mentioning.—W. W. ESAM, St. Leonards. April 19th, 1893. [It would be, perhaps, well if the gentlemen who reared this parasite were to find from each other whether

they had bought pupæ from the same dealer. If Major-General Carden had not bought pupæ of *machaon*, such an error could hardly occur with his specimens, and it would tend to confirm the dealer's statement with regard to Mr. Esam's specimens.—ED.]

ERRATIC COPULATION.—Whilst searching with a light for *N. hispidaria* on oak trunks at Chingford, I took a *Hibernia marginaria*, in cop. with a *Nyssia hispidaria*; this will, perhaps, interest your readers; although we could obtain no ova, as the female, after living a week, died without depositing.—F. W. HARVEY, Tottenham.—[The sexes of each species should always be given in a communication of this kind.—ED.]

EGG LAYING OF ENDROMIS VERSICOLOR.—A male and female emerged in the afternoon of February 27th, and must have paired almost immediately. They continued in copulation until 10 p.m. the same evening. The female began laying at 10.45 p.m. on dead twigs of birch, to which they were fastened on their long sides in rows of six to eight, or ten; in one case one row being laid on the other, and at first very conspicuous. The egg is long, somewhat cylindrical in shape, but almost twice as long as broad, and with the extremities rounded; the colour is pale green, changing very quickly to pale yellow, whilst the following morning the yellow was much deeper. A distinct longitudinal depression is noticeable along the upper side of the egg. Three days after, they became orange, whilst the development of the embryo could be seen to be rapidly perfecting, certain dark areas being very pronounced. The colour changes gradually to purple, until, five days after being laid, they are of a tint roughly corresponding to the dead birch twigs (some of them still yellow, and, I presume, infertile). The eggs were first laid in rows on the long side of the egg on the twigs, the ♀, after thus laying several little batches of eggs utilised cracks in the box in which she was placed for the purpose, the ovipositor being thrust round in such a manner as to suggest that this may be a frequent habit in nature. The eggs, too, so conspicuous when first laid, are thus well hidden. This female laid just 100 eggs, and died on March 4th, the abdomen being, apparently, quite empty. The larvæ commenced to hatch on April 6th.

A second male and female emerged on February 28th, and I found them in copulation before 5 p.m. These separated at 10.30, and the ♀ commenced laying the same night in crevices of the box between two layers of cardboard. Some of these rows consisted of as many as 20 eggs, and were very regularly arranged. This female laid about 136 eggs, and died on March 5th. The larvæ commenced to hatch on April 11th.—J. W. TUTT.

With regard to the way in which the ova of *E. versicolor* are laid in a natural state, I think I can throw a little light on the subject. While searching for larva of *Geometra papilionaria* at Wyre Forest in the spring of 1891, I found ova of *E. versicolor* in a little cluster at the end of a thin twig. Careful searching resulted in a smaller batch being found under exactly similar conditions. Although the above does not prove that this is the universal habit of the species, it certainly supplies an interesting fact.—G. W. WYNN, 192, Lozells Road, Handsworth, Birmingham.

PARASITES ON LARVÆ OF MELITÆA AURINIA.—In searching for larvæ of *M. aurinia* (*artemis*), on Friday last, I came across a few (in two

batches), of very small ones, still under their winter web, and along with them, some cocoons of their enemy, one of the ichneumons. From this fact, it appears as though the larvæ were stung during their early days last fall. Is it usual for larvæ feeding under webs to be stung while thus screened? It is acknowledged that *artemis* is highly liable to be stung; but one would think this liability really commences when they leave their winter retreat and lie in the open, thus being very exposed to attack. I send a few that you may see them.—G. A. BIRKENHEAD, Downs View, Penarth, near Cardiff. April 4th, 1893.—[We sent the cocoons to Mr. Bignell of Stonehouse, Plymouth, and he writes concerning them:—"I have not the slightest doubt that the *Apanteles* cocoons, formed by the parasite of *artemis* emerged from their host this spring. The species, from the appearance of the cocoon, is a new parasite on this larva; it does not resemble any of the three species already obtained from *artemis*; those obtained, contain much more silk and are larger; these have the look of being half-starved. The three species which have already been bred from this species are:—*Apanteles bignellii*, 'cocoons enclosed in a common web of cottony texture' (cocoons in a ball of flossy silk); *A. spurius* in cocoons of white silk; and *A. zygænarum*, in cocoons of yellow silk. These two are like miniature cocoons of the mulberry silk-worm, with plenty of floss silk, as seen in the last mentioned. I have had *artemis* from Scotland, and have found, when they are abundant, that nine-tenths are ichneumonated. I strongly suspect that will be the end of those not yet showing it (7/4/93)."—Ed.].

CANNIBAL HAIRY CATERPILLARS.—I have missed *Arctia caja* at times, in an unaccountable way from my cages, but never detected any cannibalistic propensities amongst the larvæ. But when freshly turned to pupa, before the tender skin has emitted the varnishing liquid, and colour is not as yet set up, I have noticed they are quite a toothsome delicacy. The enveloping cocoon is cut open, and the juices sucked from the pupa by any neighbouring larvæ, sometimes more than one feeding in concert.—SYDNEY WEBB, Dover. April 24th, 1893.

PRESERVING OVA.—Can anyone give me any information as to preserving the colour of ova?; also, the best way of killing and mounting the same? I mount with gum tragacanth on white cards, but should be pleased to have any hints on the subject.—FRANK BOUSKELL, Lansdowne Road, Stoneygate, Leicester.

PRACTICAL HINTS.

SUGARING.—It would be well for our collectors to bear in mind the phenomenal number of insects attracted last year at the end of May. Many NOCTUÆ are already well out, and I have heard of several successful "sugaring" expeditions already. In a season like the present, when June insects are now getting well out, and are a month in advance, it is high time the collector was on the warpath, if he is to get the early NOCTUÆ.—J. W. TUTT. May, 1893.

THE MONTH.—This is the great day beating month for larvæ. Most of the hybernated larvæ are now full-fed, and are, therefore, little

trouble in bringing to healthy pupæ. Besides the hibernated species, larvæ in very early stages will be found in the beating tray; these, of course, are less likely to be "stung," i.e., infected with parasites, and will, to the careful breeder and ardent student, repay his patience. Cannibal larvæ must be carefully looked out for and boxed separately, otherwise they will make short work of our other captures, and probably the rarest of them. *Cosmia trapezina*, pale green, with white spots, head whitish—very active, and having a vicious look—is a perfect demon, and must be carefully looked after, as he thinks nothing of devouring his brother or sister! *Scopelosoma satellitia* is easily known from its almost black velvety colour, and having a pure white spot on the 2nd, 3rd, 6th, and 12th segments. Great care must be taken with your food plant to carefully examine every rolled-up leaf; one of these wretches in a larva cage will work fearful havoc. Many elaborate arrangements are sold by dealers for *beating* purposes, but an old gamp suits admirably. Hold well under the branch or bush, and with a stout stick give a sharp tap to the thicker twigs, when larvæ and spiders, &c., will tumble out in surprising numbers; pick out what you want, and put in your larva tin, always supplying food from the same plant; reverse the umbrella, and allow the rejected to find their way back to their favourite haunts. Great care must always be taken not to crowd your breeding cages either with species or food-plant, and cleanliness and fresh food are great desiderata. Where the food-plant is very difficult to obtain, a little charcoal added to the water will keep it fresh much longer. The great increase in the list of imagines for this month almost precludes the possibility of even mentioning them. Many *Diurni* are now on the wing, and the young collector must not dash wildly after each species seen, otherwise his legs will get tired before the day is well begun. Many Geometers are now out, and will be found in quiet nooks during day, but will hardly escape the now practised eye of the young entomologist—J. P. MUTCH.

FLOWERS ATTRACTIVE TO LEPIDOPTERA.—Thinking the following paragraph in a recent *Daily News* may interest (especially metropolitan) readers of the *Record*, I venture to send it for insertion:—"A suggestion that valerian should be planted to attract the butterflies in our parks is made by Mr. A. Hensman, 31, Harley Street, Cavendish Square, W., who attributes to the valerian in Regent's Park the profusion of butterflies there last autumn. He says:—"Several species of the common white butterfly are to be seen every year all over London, but such a variety of the *Vanessidæ* I never saw before. The painted lady, large and small tortoiseshell, red admiral, and the lovely peacock butterfly literally swarmed on the valerian, which is so attractive to these species. I counted on one small patch which I could have covered with my hat four of the above-named species."—HERBERT E. PAGE, Greenwich Road, S.E. April 7th, 1893.

HYBERNATING LARVÆ.—The Rev. G. M. A. Hewett kindly gave me some ova of *Boarmia roboraria* last autumn. These I sleeved on birch. They were awake long before the birch was out, but they ate the bark, and got fat on it. It may be useful to remind our London collectors that birch is a food for this species. Birch is so easy and oak so difficult to grow in our London gardens.—J. W. TUTT. May, 1893.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*April 12th.*—Sir John Talbot Dillwyn Llewelyn, Bart., exhibited a number of specimens of Lepidoptera and Hymenoptera, all caught in Glamorganshire. The Lepidoptera included some remarkable varieties of *Vanessa io*, from which the usual eye-like spots in the hind wings were absent; varieties of *Arctia menthastri*; a long series of melanic and other forms of *Boarmia repandata* and *Tephrosia crepuscularia*; and bleached forms of *Geometra papilionaria*. The Coleoptera included specimens of *Prionus coriarius*, *Pyrochroa coccinea*, *Otiorhynchus sulcatus*, and *Astynomus œdilis*, a large species of Longicornia, which Sir John Llewelyn stated had been handed to him by colliers, who obtained them from the wooden props used in the coal mines, made out of timber imported from the Baltic. Mr. Merrifield, Dr. Sharp, and Mr. Stevens, made some remarks on the specimens. Sir John T. D. Llewelyn enquired whether the name of the moth which had a sufficiently long proboscis to fertilize the large Madagascar species of Orchis, *Angræcum sesquipedale*, was known. Mr. C. O. Waterhouse stated, that the collections received at the British Museum, from Madagascar, had been examined with the view to the discovery of the species, but up to the present, it had not been identified. Mr. H. Goss exhibited, for Mr. Frank W. P. Dennis, of Bahia, Brazil, several nests of Trap-door Spiders, containing living specimens of the spider, and read a communication from Mr. Dennis on the subject. Several photographs of the nests and the spiders were also exhibited. It was stated that Mr. Dennis had found these nests at Bahia, in one spot only, in a cocoa-nut grove close by the sea. Mr. McLachlan read a paper entitled "On species of *Chrysopa* observed in the Eastern Pyrenees; together with descriptions of, and notes on, new or little known Palæarctic forms of the genus." The author stated that the species referred to in this paper, had been observed by him in the Eastern Pyrenees, in July, 1886, when staying with Mons. René Oberthür. After describing the nature of the district, and its capabilities, from an entomological point of view, the paper concluded with descriptions of certain new palæarctic species of the genus. Dr. Sharp, who said that he was acquainted with the district, and Mr. Merrifield made some remarks on the paper.—H. Goss, *Hon. Secretary*.

SOUTH LONDON ENTOMOLOGICAL SOCIETY.—*April 13th.*—Mr. Edwards exhibited, through the President, a specimen of *Papilio jovindra*, from the Himalayan region; Mr. Weir remarking that the species was a mimic. Mr. R. Adkin read an extract from an interesting letter addressed to Mr. Billups, by Mr. T. D. A. Cockerell, from Jamaica, and exhibited the leaves containing the species of *Coccidæ* referred to. Mr. Manger exhibited *Dorippe japonica*, a Crustacean from Japan. Mr. Adkin exhibited a small collection of Sphinges and Bombyces from Sutherlandshire, N.B., consisting of *Sesia scoliiformis*, Bork., *Arctia caja*, L., *Dicranura vinula*, L., *Orgyia antiqua*, L., *Nemeophila plantaginis*, L., *N. russula*, L., the male specimen of which had smoky hind wings, and *Odonestis potatoaria*, L., the coloration of the female being intermediate between the sexes. Mr. Perks showed a bramble leaf, from Chessington, Surrey, corroded by a microscopic fungus. The Secretary, Mr. H. Williams, read a letter from Mr. Robson of Hartlepool, requesting aid

from members of the Society, in filling up forms he had prepared, asking for certain information as to meteorological conditions, &c., when sugaring for *Noctuæ*, and thus, by comparing results from different parts of the country, Mr. Robson hoped to come to some conclusion, regarding some of the anomalies of this subject. Mr. Robson said he would be happy to send forms to any applicant for same. Mr. Turner reported the capture of *Eupithecia nanata*, Hb., *Ematurga atomaria*, L., and larvæ of *Thera firmata*, Hb., *T. variata*, Schiff., and *Ellopiæ fasciaria*, Schiff., and Mr. Carpenter said that *Thecla rubi*, L., had been taken at Eynsford, Kent, on April 3rd, and *Syrichthus malvæ*, L., on April 9th. The remainder of the evening was devoted to a long discussion with regard to the proposed excursions of the Society during the ensuing summer.

April 27th, 1893.—Mr. Tutt exhibited a series of *Tapinostola concolor*, Gn., from Cambridgeshire, taken by Mr. Albert Houghton, and remarked upon the apparently extremely restricted range of this species, and in how very few localities it had been taken in any number; and Mr. Tutt also pointed out the confusion that had arisen with regard to the nomenclature of this insect, in consequence of Hübner's figure of *T. extrema*, which has blackish cilia, having been supposed to be *concolor*. Mr. Weir mentioned that specimens of *Polyommatus dispar*, Haw, had fetched £6 each on Tuesday last, at Stevens' Auction Rooms. Mr. W. H. Wright exhibited a very long and variable series of *Bombyx castrensis*, L., bred from larvæ captured on the banks of the Medway, and mentioned, that his experience was, that unless the larvæ were, say, within about a week of being full fed when captured, they usually refused to feed, and seldom came to perfection. Mr. R. Adkin and Mr. Tutt both corroborated this view, stating that the species was especially resentful to a change of habitat. In proof of the recent extraordinary fine weather, Mr. Tutt mentioned that *Melitæa cinzia*, L., and other June species, were on the wing in Guernsey, and that *Lycæna argiolus*, L., were flying at Hereford during the first week in April, and Mr. R. Adkin noted the rare occurrence of the blackthorn (*Prunus spinosa*) and whitethorn (*Cratægus oxyacantha*), being in blossom at the same time. In the course of some remarks upon *Colias edusa*, Hb., Mr. Tutt said this species ought to have had a good chance of hibernating here in the imago state this last winter, as circumstances were so entirely in its favour, and that failure to do this, in a winter like that just past, would point to its inability to do so at all in England. In Algeria and Morocco, it could be obtained in all its stages, with the exception of the egg, nearly the whole year through, and that in the Mediterranean littoral, it practically did not hibernate at all, but one brood followed the other in rapid succession.—F. W. HAWES and H. WILLIAMS, *Hon. Secs.*

CITY OF LONDON ENTOMOLOGICAL SOCIETY.—*April 18th*, 1893.—Exhibits:—Mr. Tremayne, various *Hybernideæ* and a ♂ example of *Nyssia hispidaria* from Epping Forest, where the latter species has been somewhat plentiful this year; Mr. Riches, bred examples of *Smerinthus ocellatus*, *populi* and *tiliæ*; Mr. Clark, a series of *Eupithecia pumilata* from Bournemouth, and a ♀ specimen of *Selenia tetrahmaria*, recently taken in the New Forest; Mr. Smith, a ♀ example of *Amphidasys strataria* (*prodromaria*), also *Asphalia flavicornis* and *Brephos parthenias* from Epping Forest; he also remarked that the latter species had been unusually abundant there this spring; Mr. Lane, a

series of *Colias edusa*, including the var. ♀ *helice* captured last season at Loughton; Mr. Gates, living examples of the local *Adela cuprella* from Wimbledon, and specimens of *Gelechia atriplicella* from Hammer-smith. *Coleoptera*:—Mr. Heasler, a series of *Paromalus flavicornis* from Richmond Park; Mr. Clark, who had just returned from the New Forest, reported the capture of *Aleucis pictaria* and *Notodonta chaonia* in that locality, also *Arctia fuliginosa* at Bournemouth; he further stated that he had taken a ♀ specimen of the glow-worm (*Lampyris noctiluca*) on April 12th; Mr. Lewcock stated that *Panolis piniperda* had been fairly common at Farnham; and Mr. Nicholson recorded *A. strataria* (*prodromaria*) from West Wickham.

Tuesday, 2nd May, 1893.—Exhibits:—Mr. Clark, *Nyssia hispidaria*, with a pale marginal band, a pale grey specimen of *Tæniocampa instabilis*, with a dark central band, and *Notodonta chaonia*, all captured recently in the New Forest. Mr. Oldham, *Trachea piniperda*, a dark form of *Tæniocampa instabilis*, and *Brephos parthenias*. Dr. Buckell, series of *Polia chi*, from various localities, including the var. *suffusa*, from Sheffield.

Mr. Hollis, melanic specimens of *Diurnæa fagella*, from Highgate, and living larvæ of *Ocneria dispar*. Mr. Battley a variable series of *Tæniocampa munda*, from Epping Forest. Captain Thompson, a living larva of *Geometra papilionaria*. Mr. Adye, a series of *Boarmia repandata*, from the New Forest, including some fine specimens of var. *conversaria*. Mr. Tremayne, living larvæ from Epping Forest, including *Nola cucularella*, *Himera pennaria* and *Miselia oxyacanthæ*. Mr. Bacot, *Amphidasys prodromaria*, *Tæniocampa populeti*, and a pale variety of *T. instabilis*, all from Epping Forest.

Coleoptera:—Mr. Heasler a series of *Anchomenus thoreyi*, from the Plumstead marshes. Mr. Lewcock, a living larva of *Pulex irritans*. Mr. Tutt then read a paper on "Melanochroism in British Lepidoptera," being a criticism of Mr. Robson's paper, "Is moisture the cause of melanism?" read before the Society, in February last.

In the discussion that ensued, Mr. Lewcock drew attention to the fact that species frequently showed a distinct and constant tendency to vary in a particular direction, apart from the more polymorphic tendencies to general variation frequently observed. Mr. Bacot said that he could hardly understand the application of the suggestion that dark colours on the wings of lepidoptera were more advantageous to them than lighter colours, by absorbing more heat, as it was the bodies of insects which were required to benefit by such an advantage, and not the wings. Mr. Tutt said that some observations he had made under the microscope seemed to bear out Mr. Bacot's view, as the wing appeared to cease to be a vital organ very early indeed in the imaginal life, and that the absorption of heat by the wings would, under those conditions, scarcely affect the vital functions of the imago.

On the motion of Drs. Buckell and Sequeira, a vote of thanks was accorded to Mr. Tutt for his paper.—A. U. BATTLEY and J. A. SIMES, *Hon. Secs.*

PENARTH ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—In connection with the Fifth Annual Meeting of this Society, a most enjoyable gathering was convened on Wednesday evening, March 22nd, in the Public Hall, taking the form of an exhibition and conversazione. The large room was suitably fitted up for the occasion, and decorated

with plants, flowers, and pictures, whilst all around, and on ranges of tables in the centre, were arranged cases of insects, birds, shells, seaweeds, corals, ferns, &c., besides a series of interesting curios.—Most of the entomological specimens were the fruits of local research, and afforded evidence of the richness of the district, from a naturalist's point of view.

An important contribution was from the collection of Lepidoptera belonging to Sir. J. T. D. Llewelyn, the President of the Society. The cases forwarded to Penarth were of course only part of his magnificent collection, considered to be the largest in the West of England; but they were certainly unique, and much admired. The other members who contributed towards the impromptu museum, were Dr. Bird, Prof. Howe, Messrs. Birkenhead, Drane, Howe, Mason, Neale, Strong, Taylor, T. H. Thomas, J. Wallis, C. W. Williams, from whose collections, upwards of 150 cases were sent.

The largely-attended gathering at the conversazione in the evening, was presided over by T. H. Thomas, Esq., R.C.A., President of the Cardiff Biological Society, who, in a brief address, emphasised the advantages derivable from the fascinating pursuits encouraged by the Society, and directed attention to the fact that many interesting objects of Natural History were rapidly becoming extinct, and that, but for such societies as this, no traces would be preserved. The fifth Report, which was read by the Secretary, showed the Society to be in a flourishing condition, and stated that last year, as a result of the prevailing fine weather, had proved the most successful which the Society had yet experienced. At intervals, in an adjoining room, a series of beautiful objects were exhibited, with the limelight microscope, by Mr. J. Stowie, late curator of the Cardiff Museum. A selection of vocal and instrumental music was given during the evening, and much interest and amusement was afforded, by notes of a visit to Fiji, given by Mr. T. Mason. The evening's engagements throughout were most satisfactory.—J. WALLIS, *Hon. Sec.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—*April 10th.*—Mr. H. W. Bowler, Lisbon-road, Broadgreen, was elected a member of the Society. Mr. John Watson read a paper entitled "Notes on three hybrid silk moths." The author, in speaking of these hybrids, stated that he had microscopically examined the female hybrids, and found them infertile, there being no trace of an ovary. He also stated that the hybrid larvæ spun double the weight of silk in forming the cocoon, than either of the parents.—Dr. H. H. Corbett read a paper entitled "Notes on the Lepidoptera of Doncaster." He enumerated the lepidoptera taken by him around Doncaster, and drew attention to the local variation of several species. He exhibited and described *Lithocolletis cerasicolella*, a species new to the British list, which had just been added by himself. Mr. Watson exhibited *Papilio elvesii* female from Central China, which, as far as he knew, was at present unique. The president exhibited *Papilio machaon*; and Mr. Newstead, a collection of *Coccidæ*, formed by Miss Tomlin, from Madras.—F. N. PIERCE, *Hon. Sec.*, 7, The Elms, Dingle, Liverpool.

BIRMINGHAM ENTOMOLOGICAL SOCIETY.—*March 20th, 1893.*—The following exhibits were made:—Mr. R. C. Bradley, insects from Sutton, including *Eubolia cervinaria*, etc.; Mr. E. W. Wynn, insects from Wyre Forest, including *Dicranura bifida*, *Lobophora hexapterata*,

etc., also *Smerinthus tilia* from Stanbury Park; Mr. W. Harrison, *Amphidasys prodromaria* from Arley, etc. Mr. G. H. Kenrick read a paper upon "The occurrence of the black variety of *A. betularia*." He said it was first described by Millière in 1859 from a specimen from York, when it seems to have been a new and exceptional form; in 1869 Newman says of the species *some* are black; since then it appears to have been getting more and more common, till now it forms a large proportion of the whole. Mr. Kenrick mentioned the various theories of the cause of black forms, but did not think them sufficient to account for the origin of this. He thought the form might have arisen in this manner:—In all cases offspring more or less resemble their parents, sometimes both, sometimes only one, occasionally the tendency to follow one parent only being very strong; in breeding *doubledayaria* even if one parent be the type form, the tendency seems to be for most of the offspring to be black; may not a chance sport, a chance black variety have been perpetuated in this manner, most of the offspring resembling it? The species is a hardy one. The black variety does not seem to have an advantage over the type, nor does its colour seem to injure it at all. There would be no selection of type or variety, but the black parent would bring more and more black offspring into the world even when mated with the type, and thus the form would increase in proportion. The paper was discussed at length by the Rev. E. T. Nurse, Messrs. G. T. Bethune-Baker, R. C. Bradley, and C. J. Wainwright.—COLBRAN J. WAINWRIGHT, *Hon. Sec.*

LEICESTER ENTOMOLOGICAL CLUB.—April 11th, 1893.—F. Bates, Esq., in the chair. The Report of the Easter Excursions to Charnwood Forest were read by the Hon. Sec.; some of the best records being:—LEPIDOPTERA.—*Amphidasys prodromaria*, *Lobophora lobulata*, new to Leicestershire, *Brephos parthenias*, *Xylocampa lithoriza*, *Taeniocampa pulverulenta*, in bright sunshine. COLEOPTERA.—*Amphicyllis globus*, *Ips quadriguttatus* (new to county), *Rhizophagus dispar*, *B. bipustulatus*, *Rhinosismus ruficollis*, *B. planirostris*, *Bembidium tibiale* (Charnwood var.). The Hon. Sec. gave a record of the captures up to date, and some notes on the earliness of the season, everything being five weeks earlier than usual. *Exhibits*.—Mr. Dixon, a fine lot of variable *Taeniocampa instabilis* and *T. stabilis*, *Amphidasys betularia* and var. *doubledayaria*; the Chairman, a box of Coleoptera; Mr. C. B. Headly, *Eupithecia dodoneata*, vars. of larvæ of *Phlogophora meticulosa*; the Hon Sec., a box illustrating the life histories of several Lepidoptera and ova of various species. The next excursion was arranged for Swithland Wood on April 22nd. May 1st, 1893.—The report of the excursions and records since the last month were read by the Hon. Sec.; the following are some of the captures:—LEPIDOPTERA.—*Euchloe cardamines*, *Hemerophila abruptaria*, *Tephrosia crepuscularia*, *T. biundularia*, *Geometra papilionaria* (larvæ), *Lobophora lobulata*, *Cidaria corylata*, *C. suffumata*, *Drepana lacertinaria*, *Xylocampa lithoriza*, *Hadena thalassina*. COLEOPTERA.—*Rhagium inquisitor*, *Ips quadriguttatus*, *Silpha thoracica*, *S. quadripunctata*, *Anchomenus junceus*. *Exhibits*.—Mr. F. Bates, 20 boxes of Coleoptera, containing the British *Carabidæ*; Mr. Dixon, larvæ of *Taeniocampa stabilis*; Mr. C. B. Headly, *Asphalia ridens*, and vars. of *Rumia cratægata*, larvæ; Mr. A. M. Corali, a fine series of *Papilio machaon* from Wicken pupæ; the Hon. Sec., a long series of *Hybernia marginaria* and vars. *fuscata*, with a number of intermediate forms, also *Demas coryli*, ova

of *Xylocampa lithoriza*, *Biston hirtaria*, *Tephrosia crepuscularia*, *Lobophora lobulata*.—FRANK BOUSKELL, *Hon. Sec.*

NOTICES AND REVIEWS.

VICTORIAN BUTTERFLIES, AND HOW TO COLLECT THEM. Published by H. Hearne & Co, 208-210, Little Lonsdale Street, Melbourne. Part I, price 4s. Many of our readers will be pleased to hear of this work, brought out by Mr. E. Anderson, a former Secretary of the City of London Entomological Society, in conjunction with Mr. F. P. Spry, a member of the Field Naturalists' Club of Victoria. The first part to hand is a good deal on the lines of Newman's *British Butterflies*, and contains a general Introduction, with some concise notes on the oval, larval and pupal conditions; on pinning, killing, and setting insects; a diagrammatic representation of a butterfly, with the names of the nervures, the various parts of the wing, and body, &c. The second part is, to a great extent, descriptive, but the great value of the book consists in the well-executed wood-cuts scattered throughout. There is one of the male and another of the female of almost every species dealt with, whilst many have a figure of the larva and pupa in addition, and these are so well done that there can be but little trouble for the student to name his captures from them. The figures of *Pieris teutonia* give us a characteristic white *Pieris* with a black border on the outer margin of all four wings, the border containing a row of marginal dots as in *Colias hyale* and *C. edusa* ♀, a fact of the highest phylogenetic significance, whilst those of *Tachyris ega* show the way in which *Pierinae* with spotted borders are modified into the black-tipped forms as in *Synchlōe daphidice*, &c. Mr. Anderson mentions *Danaus* (*Danais* ?) *petilia* as having been recorded from England (p. 42), an evident error; whilst he correctly records *D. erippus* as having been taken here. He maintains *Pyrameis kershawi* as being probably identical with *P. cardui*, and writes of it:—"The chief point of difference is stated to be the blue centres of three spots on the posterior wings of the Australian insect—a difference which Sir F. McCoy states to be quite invariable. As pointed out by Mr. Oliff, the variety with blue spots has been taken in the New Forest, England, by Mr. Jenner Weir, and also by himself in Holland. Moreover, during one of the popular excursions of the Field Naturalists' Club of Victoria to Mount Dandenong, one of the authors captured a specimen with black spots, similar to the European form, so as both forms are found in both localities, it would appear that there is only one species" (pp. 73-74). There are many other paragraphs to be found of general interest. We must congratulate the authors on their work, and would only ask that, where possible, fuller descriptions of the egg might be added with advantage, and some reference to the appearance of the larvæ in their various skins. The printing and general get-up of the book appears to be most satisfactory. The first part contains the *Papilionida* (*Papilioninae* and *Pierinae*); and the *Nymphalida* (*Danainae*, *Satyrinae* and *Nymphalinae*). Any English lepidopterists who would like to have the work, can obtain it through Mr. J. A. Clark, The Broadway, London Fields, N.E.

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MELANOCHROISM IN BRITISH LEPIDOPTERA.

By A. R. GROTE, M.A.

Mr. Tutt's interesting paper, in reply to Mr. Robson, will have drawn fresh attention to this important phase of Variation in the Lepidoptera. The fact must be assumed as fully proven by Mr. Tutt that "areas which are excessively humid, and those that had, by artificial change of environment, produced dark surfaces," have produced also melanic races of Lepidoptera. The darkening of the resting places by rain and smoke, the (supposed) action of the moisture on the larva, and finally, "natural selection," availing itself of the physical environment and the inherent tendency of the species to melanism, are accordingly claimed to have succeeded in producing a greater number of dark individuals. I think we may eliminate from the problem the action of "natural selection" and the effect of humidity on the larvæ, because these are factors, the *modus operandi* of which has not been, in the latter case scientifically, in the former, here only inferentially, explained or proved. There remains the fact, that in localities affording dark resting places for the moths, melanism is frequent. May not the explanation be that the dark resting places are protective? Granted the existing tendency to melanism, would not a greater number of specimens of the dark forms be preserved from natural enemies by their resemblance to their resting places in colour? Thus the collector, not being so easily deceived, would obtain a greater percentage of dark forms from such localities. I take it for granted that melanism is the result of reversion, and that it is inherited. Melanic parents do not produce necessarily melanic progeny, or at least, exclusively melanic races. Melanism occurs sporadically with certain species, and this also in localities not particularly wet, and not at all smoky. Certainly neither the "actinic" theory, nor perhaps even the "natural selection" theory seems rightly used to account for a phenomenon which has its basis in inheritance, and which displays itself more obviously in surroundings which aid in its protection. Reversion is inheritance acting through larger intervals. It does not seem to be proven that a greater total amount of dark forms are absolutely produced in wet and smoky places. But, in such places, the pale forms would be the first to be destroyed from their contrast to their environment, and the consequent attention of their

natural enemies. The dark forms would appear to be more plentifully produced because artificially preserved from their resemblance to their environment and the consequent inattention of their natural enemies. We cannot call "natural selection" to solve the problem, unless we regard melanism as a step, however small or large, however uncertain, in the direction of specific separation. So far as my studies on American Lepidoptera go, I have shown the probability that in such genera as *Basilarchia* (*Limnitis*, part. Auct.), *Datana*, *Platysamia*, *Hemileuca*, the separation of species has been comparatively recent, but in whatever way the separation has been effected, it has clearly not been due to the appearance of characters at reversion or inheritance, but to some new "force" impelling a change in a fresh direction, to a splitting of an original type into "varieties," "races," and finally, "species," which may, in some cases, occupy the same territory, and be subject to the same climatic conditions. Going hand in hand with this "force," which has caused the splitting up of what was once probably a single "species" into what is now half a dozen, there has been an inherent adaptability displayed by the original species, a want of resistance to whatever has caused the splitting of the original type. Thus some types are shown to be more plastic than others, to be less original and firmly moulded. Such insects as *Pygæra bucephala* and *Datana ministra* (not improbably identical in the Tertiary epochs) are examples of these plastic forms. The characters displayed under variation need a categorical separation as to their significance and value.—Bremen, Germany. *May*, 1893.

I do not quite follow Mr. Grote's reasoning when he says, "I think we may eliminate from the problem the action of 'natural selection' and the effect of humidity on the larvæ, because these are factors, the *modus operandi* of which has not been, in the latter case, scientifically, in the former, here only inferentially, explained or proven." The action of humidity in producing ordinary variation has been, in a degree, scientifically proved since experiments on seasonally dimorphic Indian butterflies have been carefully carried out, and it has been shown that by artificially exposing larvæ of the different broods to the opposite conditions to those to which they would naturally be exposed, the resultant imagines were of the type generated by the surroundings, in spite of what we may assume to have been the hereditary tendency in the opposite direction; so that exposure to a moist or a dry atmosphere, resulted in the production of the "dry" and "wet" season forms. Hence it seems that there is a direct connection and a direct action on the larva. With regard to the influence of "natural selection" having been "only inferentially explained or proven," it can only be admitted that such is the case to the extent that all references to "natural selection" are necessarily in the way of inference, rather than of actual fact, the inferences, however, being based on observed facts. In the case of observation in this direction, however, on many lepidoptera, the inferences are so palpable as to be almost as patent as the facts, and these can scarcely be eliminated in any explanation given.

Mr. Grote further says:—"May not the explanation be that the dark resting places are protective?" I think I have fully proved that the resting places are protective, and it is on the undoubted fact underlying Mr. Grote's present query, that the influence of "natural selection" has its strong basis, for the direct result of the protective nature

of these resting places is, to favour the most protected specimens, and eliminate the least protected specimens, which I take it is "natural selection," and which, therefore, renders abortive Mr. Grote's previous suggestion "that the *modus operandi* of 'natural selection' has only been inferentially explained or proven."

Mr. Grote says:—"Melanism occurs sporadically with certain species, and this also, in localities not particularly wet, and not at all smoky." This is so, and is undoubtedly due generally to reversion, as I have pointed out more than once in *Melanism and Melanochroism*, but with regard to the preceding paragraph that "melanic parents do not produce necessarily melanic progeny, or at least exclusively melanic races," it must be admitted that the direct hereditary influence of the actual parents is not sufficiently powerful to do the latter completely, but in a large degree, it is sufficiently powerful to produce a large percentage of melanic specimens. We select black *Amphidasys betularia* and black *Tephrosia crepuscularia* for the purpose of breeding black specimens, thus showing, that whilst the general principle of hereditary tendency *may* give us black specimens, the direct result arising from the selection of actually black parents is enormously increased, and more certainly brings about the desired result. We, in fact, change the probability of getting a chance specimen or two of the desired dark colour, to the certainty of getting a number of such. I am quite contra to Mr. Grote when he says that "it does not seem to be proven that a greater total amount of dark forms are absolutely produced in wet and smoky places." Practical experience in Britain (at least) shows that such a statement is very wide of the mark, and there is no shadow of doubt that there is a much larger total number of dark forms produced in wet and smoky places, for only in such places do we get dark specimens of many species at all. The second part of this paragraph, in which Mr. Grote says "the pale forms would be the first to be destroyed" owing "to the consequent attention of their natural enemies," and that, therefore, as a result, "the dark forms would *appear* to be more plentifully produced, because artificially preserved," will not hold water, because such an excess is equally observable in bred specimens from such localities and is not a resultant of anything taking place after the moths have emerged. In fact, were the suggestion which Mr. Grote makes, possible, it would result that "melanism" is now in existence on a large scale everywhere, and that the general result was due to nothing but "natural selection" of the most pronounced kind on each individual brood. But that is not so. We breed pale races from certain localities; we breed dark races from other localities, with an occasional odd variety either way: but every brood is not a mixture of dark and light specimens, of which the former are destroyed every year in one locality, and the latter in another. I quite agree with Mr. Grote in his general notion that many species were originally dark; I stated so expressly in my paper, and have repeated the statement more than once since. I also agree that in many instances the present melanic races are outcomes of hereditary tendency or reversion towards this original form, and that there is, therefore, an inherent tendency in the insect to become dark. What we are concerned with, is not so much the inherent capacity in insects to vary, which we all acknowledge to exist, but with the forces in existence at the present time, which will draw out these latent tendencies, and which cause the insect to make these

latent tendencies outward and visible signs to us. Mr. Grote's paper is altogether a very striking and welcome addition to the subject, and supports the "natural selection" theory entirely. That it was written with another view only makes it the more valuable.

With regard to the suggestions in the latter part of Mr. Grote's note, there can be no doubt that in all countries some species are more fixed and less liable to branch off into other species than others, and further, that many species are much more recent than others. Among the *Diurni*,—many of the genera of the *Satyridæ* and the "blues" (genus *Lycæna*); the *tritici-cursoria* group of *Agrotis*; the genus *Tephrosia*, and others equally pronounced at once occur to one's mind. Successful hybridisation is probably often due to the alliance of comparatively recent species. Certainly the characters displayed under variation need careful discrimination and classification. We are certainly advancing to the required end, although it may be much more slowly than some of us desire, but perhaps this is really a blessing in disguise.—J. W. TUTT.

STRAY NOTES ON CERTAIN SPECIES OF BUTTERFLIES.

By J. W. TUTT, F.E.S.

This early season has probably caused a considerable number of collectors who do not usually turn out much before June, to do so this year. Fine bright weather seems to be the one great necessity of a really good butterfly year, and as many of the *Diurni* were out in abundance last year (1892), there was every prospect, with such a spring as we have had, of a really good all-round season among the butterflies this year. So far, the promise of a good season has been fulfilled, and personally, I was, and still am, very pleased at the prospect, as I have returned to the "first love," at least for a season, and am now working out certain points in the life-history of the various species, and have been, with the kindness of friends, able to get a fairly large amount of material already. I have obtained all our *Papilionidæ* and *Pieridæ*, in their early stages, except *Leucophasia sinapis* and the two species of *Colias*; of the *Argynnidæ*, *A. paphia*, *aglaia* and *euphrosyne*, as well as *Melitæa cinxia* and *M. aurinia*; of the *Vanessidæ*, all but *Cynthia cardui* and *Grapta c-album* (this I believe I can get); of the *Satyridæ*, *Hipparchia janira*, *semele*, *Arge galatea*, *Lasiommata megera* and *L. ægeria*. Several others have reached me, in either the larval or pupal forms, and I have to thank those who have so kindly helped me. *Apatura iris*, *Limenitis sibylla*, *Gonopteryx rhamni*, *Thecla betula*, *Lycæna argiolus*, are among others I have obtained, but I am still particularly in want of *Pieris napi*, *Leucophasia sinapis*, *A. selene*, *A. adippe*, and some of the *Satyridæ* and *Lycænidæ*, the commoner the species, the more likely to be particularly useful. My application has been specially gratifying, as showing how many observers, whose names one rarely sees in the entomological magazines, are really observers, and can lay their hands at once on many species in their early stages. Some thirty years ago, practically nothing was known of the life-histories of our British butterflies; now, most of the species have been thoroughly hunted out and are pretty well known. Some of our local species, especially the northern ones, are less known, e.g., *Ctenonympha dorus*, *Erebia cassiope*.

and to a certain extent *E. blandina*. This latter I had sent me in abundance in the larval stage, by the Galashiels collectors some ten years ago. Since they have left off work, no one seems to have got the larva. I need not say that I shall be very grateful for any larvæ or pupæ that may be sent to me.

Pupæ of Parnassius apollo.—Perhaps one of the most interesting things that I have noticed since I have been collecting butterfly material, has been the pupa of *Parnassius apollo*. This larva is not particularly unlike the *Papilionidæ* with which it is sometimes classed, but, the pupa is most remarkable. The larva spins a slight web on the surface of the ground, and with no attempt at suspension in this web, it changes to a pupa. This pupa is as totally unlike a butterfly pupa as it is possible to imagine, and reminds one at first of a *Bombyx* pupa, perhaps a little of *Saturnia carpinii*. It is coated with a thick bloom, like that which one finds in *Cosmia*, *Halias*, &c., but so thick, that plenty can be scraped off, the pupa being completely coated with it. Dr. Chapman finds that it melts, but that it is perfectly insoluble in water, in fact, water runs readily off it, and he suggests that it is a waterproof coating to protect the pupa, and when one comes to consider its usual haunts among the mountains, there is a strong probability for supposing this to be correct. At any rate, it is a most interesting pupa. The effect of the direct rays of the sun on this pupa is also rather remarkable. Two pupæ placed in a window facing west, where the sun only shines for about two hours every afternoon, emerged more than a fortnight ago (May 22nd), whilst others, in a shaded greenhouse a little above ordinary temperature, emerged on June 10th.

Succincti occasionally changed into Suspensi.—Of other pupæ I notice that some of those species that naturally have a belt round their body (i.e., *Succincti*), often by accident, are unable to place themselves within the girdle after it is formed. They thus become, unwillingly of course, *Suspensi*, and it is remarkable how rarely they fail to attach themselves, without the support of the girdle, by means of the cremastral (anal) hooks alone, and then hang after the manner of *Nymphalidæ* by the cremaster. This has happened with me in *Pieris rapæ*, *Euchloë cardamines*, *Gonopteryx rhamni* and *Aporia crataegi*.

Gregarious habit in Melitæa cinxia.—The larva of *Melitæa cinxia* does not appear wholly to lose its gregarious habits, even when quite full fed, for on one occasion I found no less than three pupæ inside a common silk tent they had spun, and this silk tent is rather remarkable, and puts one in mind of the cocoon of *apollo*. I found some pupæ spun up, quite isolated, on the top of the breeding cage, but these had some loose silk about them, and in nature I should think, a loose silk covering which appears to be waterproof, is what they usually attach themselves to.

Contraction of abdominal segments ventrally in Argynnis aglaia.—It is, I daresay well known, that the sex of most pupæ may be readily determined, but the pupa of *Argynnis aglaia* is so hooked round ventrally, that the ventral surfaces of the abdominal segments are almost entirely obsolete.

Tubercles in young larvæ.—Of the larvæ the most striking peculiarity I have noticed, is with regard to the tubercles. In almost all the young larvæ that I have examined, I find that the trapezoidal tubercles (two anterior and two posterior), which are arranged in pairs all down

the back thus . . . , and the supra- and sub-spiracular (above and below the spiracles), are strongly developed, with one or more long hairs on each, and occupying a very considerable portion of the body. As growth proceeds, and the various skins are cast, the tubercles either become modified into spines as in some of the *Nymphalidæ*, or get small by degrees and beautifully less, until they are altogether obsolete as in some of the *Satyridæ*. Good larvæ in which to observe the gradual obsolescence in these tubercles are, *Euchloë cardamines* and *Lasiommata megæra*, but almost any will do, as it is remarkable how, in the early larval life, there is a tendency to conform to a common structural type, different as the larvæ may afterwards become.

The segmental condition of the head in young larvæ of Lasiommata megæra.—The newly-hatched larva of *megæra* also shows a remarkable development, the last head segment bearing 4 typical trapezoidal tubercles, arranged as a trapezoid, and with the usual hairs. The marks on the other head segments seem to have the same significance, and there can be no doubt that this points to the segments of the head as originally ordinary, tubercle- and hair-bearing segments. In the light of this view, it would be well to look at quite newly-hatched larvæ of such species as *Limenitis sibylla* and *Vanessa polychloros*, where the posterior head segment of the adult larva has fleshy spikes, probably of the same origin and significance as the spines of the thoracic and abdominal segments.

Embryo in egg of L. megæra.—It is not always easy to learn what eggs are most useful for microscopic observation, so as to note the development of the embryo. I can recommend *Lasiommata megæra* as a remarkably good one in this respect. Slenderly and delicately ribbed and reticulated, the shell is so transparent that when I first observed the fully formed embryo through the shell, the hairs, &c., were so distinct that I considered for a time they were part of the shell, and that the markings on the face of the embryo were also shell markings.

Improbability of regular hybernation of Cynthia cardui in Britain.—One other point relative to our spring butterflies has forced itself upon my notice this year, viz., the utter absence of *Cynthia cardui*, and as for several years I have observed this species, I have come to the conclusion that this species very rarely hybernates in Britain. *Vanessa urticae*, *io*, *atalanta* and *polychloros* are to be seen every year in greater or less numbers from March till June, *atalanta* sometimes as late as July, but *polychloros* is more uncertain than the others, although every year present in its well-known haunts. As soon as the warm days of spring come, out come these species and *Grapta c-album*. Not so *cardui*. *Cardui* scarcely ever appears till May, and then its appearance is most uncertain. In 1892 the species swarmed all over southern England and Ireland. In 1893 the species is as entirely gone up to the present date as *Chrysophanus dispar*. In the autumn of 1891 not a specimen of *cardui* was to be found, and yet in May, 1892, it swarmed all over the country. This I have observed repeatedly, and I believe *cardui* does not regularly hybernate here any more than does *Colias edusa*, and further, that the species is as certainly maintained as British by repeated immigration, as is *Colias edusa*.

Effect of high spring temperature on the eggs, larvæ and pupæ of butterflies.—The effect of the unwonted temperature this spring has been irregular in its action on the same species. In those that pass the—

winter in the egg state it produced a very early hatching. In those that passed the winter in the larval stage, some fed up rapidly, remained pupæ but a short time, and then emerged. Thus *Argynnis euphrosyne* was well out by April 14th in North Kent, and yet after that date Mr. Whittle sent me larvæ of the species from Essex, which are still (June 8th) in pupa. Mr. Moberly sent me pupæ of *Limenitis sibylla*, which produced butterflies on May 23rd, whilst I still have larvæ not full fed. Mr. Hodges captured *Melitæa cinxia* in Guernsey in the early part of May, and on the same day he took half fed larvæ of the species for me, some of the latter being now pupæ; *Lycæna adonis* has been coming out for a month, and is still emerging, and so on. In those that pass the winter in the pupa state there has been perhaps most difference. Thus I have winter pupæ of *P. brassicæ* at the present time, and also a pupa from an egg laid in April. The same with regard to *P. rapæ*. I have eggs, larvæ, and pupæ of *Euchloë cardamines* on my table at the present moment all from the spring emergence, whilst on Saturday (May 27th) I found a female just emerged from a winter pupa.* Hybernated *Vanessa urticæ* were still on the wing on Saturday (June 3rd) and on the same day I bred the first specimens from 1893 larvæ. At the same time I found several batches, some only just hatched, others full fed, so that the flight of this species, which normally takes place in July, will consist of the progeny of hybernated females which are still egg-laying, and those of butterflies which have already completed one cycle of existence in 1893. *Lasiommata egeria* was worn to shreds in Chattenden on the last Saturday in April. A freshly-emerged batch was out on May 27th,† both, I take it, from parents of the previous autumn, but probably belonging to different broods. As we may suppose the progeny of these will emerge as irregularly as the parents' broods, it is probable that the species will occur all the summer, good and bad specimens flying together.

Notes on emergence in a season like this will be most interesting, and should prove of actual value, as verifying some dates which we find in old authors, and which have long been looked on in the light of uncertainty. At the same time there is strong possibility that partial second broods of many usually single-brooded species will appear later in the season.—June, 1893.

SCIENTIFIC NOTES.

ARGYNNIS EUPHROSYNÉ AT FAULT.—On April 29th, this species occurred in abundance in North Kent, and I spent some little time observing it. It would appear that the males are somewhat readily attracted by the females, probably in a great measure by sight. It was rather puzzling, however, to account for the frequency with which they were at fault. On one occasion, a male fluttered up to a dead oak leaf,

* On June 7th I took a freshly emerged male in North Kent.—J. W. T.

† I have since seen reason to modify this opinion, as some young larvæ sent to me on June 3rd last, are now (June 8th) pupating, the larvæ having grown most rapidly. Probably, therefore, those noticed on May 27th were the progeny of the late March and earliest April butterflies.—J. W. T.

much of the same tint as the female insect; the manner of fluttering evidently showing that it mistook the leaf for a female; and after a time, finding its mistake, flew off, only to return on three successive occasions before it was fully satisfied of its error. I saw two other males behave in a similar manner towards other leaves. Strange to say, a week later, I made another similar observation at Cuxton.—J. W. TUTT. *May*, 1893.

EMBRYONIC DEVELOPMENT OF *XANTHIA AURAGO*.—In Mr. Tutt's interesting notes on the genus *Xanthia* in the *Ent. Record* for last March, he quotes the Rev. J. Hellins as noting that the ova of *aurago* hibernate without any perceptible development of the future larva. As a general statement this is certainly incorrect, for a female *aurago* I took at ivy on October 28th, 1892, laid 28 eggs during the following week, which began to change to a purplish colour on November 4th, and within ten days all had assumed the leaden hue characteristic of the presence of the growing larva. I should think most probably that Mr. Hellins' ova were an exception, and that the growing larvæ of *aurago* do hibernate in the egg as a rule. My larvæ emerged during the last week of March, and fortunately took kindly to the buds of the birch, from which I removed the outer coverings. They seem to creep into the buds, and most often are even now invisible, and only show signs of their existence by frass. The beech here is still only in bud, though some of the oak and ash trees even have young leaves already.—W. S. RIDING, *April 18th*, 1893.

VARIATION.

VARIATION IN *HALIAS PRASINANA*.—I met with a specimen of this species last year with very broad silver fascia (central shade?) in the middle of the wing, and having obtained some eggs therefrom, have reared a few moths. The females, as usual, show this silvery central shade more than the males, but there is not amongst them one at all remarkable in this respect; they were fed on oak. An odd larva picked up on birch has produced a yellow variety, a very unsatisfactory form, as, had I not bred it, I should have settled that it had attained this colour by fading with weather, or by some chemical application, the colour being a faded yellowish olive-green, rather than a tint entitled to be called yellow.—T. A. CHAPMAN, Firbank, Hereford.

VARIATION IN *ABRAXAS GROSSULARIATA*.—In view of the remarks in previous issues regarding varieties of the above insect, my experience (or luck) last year may be of interest. I had occasion to be in Inverkeithing, Fife, for a day towards the end of May, and while there picked off a dozen pupæ of this species from the wooden supports of the currant bushes in my friend's garden, simply to renew my series, and of those dozen two of the resulting imagines were varieties. One with yellow entirely replacing the white, both on the upper and lower wings; the other, with, only the upper wings yellow, the lower being almost normal.—DOUGLAS WALKER, Glasgow.

PRACTICAL HINTS.

THE MONTH.—This is a very busy month indeed to the entomologist. So much so that "practical" or any other "hints" will hardly be read, but will be pushed on one side, to be overhauled at a more convenient season, and with net in hand he sallies forth at an early hour in the morning eager for the fray, returning at night tired but only half satisfied with his diurnal sport, and although tired, after having snatched a hasty meal, and charged his lantern and sugaring tin, he starts off again to his nocturnal haunts. Larvæ at this time are very little thought about, although both numerous and rare. The delicate green larvæ of *Papilio machaon* may be found in fens and marshes feeding on wild carrot and other Umbelliferous plants. This is in all stages one of our most beautiful butterflies; *Gonopteryx rhamni*, also, is feeding on the two buckthorns. *Thecla betulæ*, feeding on sloe, may be beaten out, but is more readily found at night, at which time it feeds, unlike most of the *Rhopalocera*. *Petasia cassinea* on elm and nut, not common or easily seen. Most of the butterflies are on the wing, and good "bags" may be made. The *Sesia* family are nearly all out, but want careful looking for; when one is caught, others may be readily seen flitting about from place to place in the bright sunshine. *Stauropus fagi* found at rest on tree trunks is a grand prize, more especially if a ♀ with plenty of fertile ova. If asked where to search this month, the reply would be "everywhere."—J. P. MURCH.

HINTS.—(1). Look at the seed-heads of *Silene* during June and July. Little round holes (sometimes with the frass projecting) will frequently be seen. Collect all such heads and tie up in a linen bag. Large numbers of *Dianthæcæ* may be bred.

(2). As soon as *Clematis vitalba* is in bloom, search for buds showing a small black hole. Collect such buds, tie them up in linen bags, and you will get plenty of *Eupithecia isogrammata*.

(3). Look carefully in reed beds, for reeds showing the central leaf yellow. Cut low down and place in water. You will breed *Nonagria geminipuncta*.—J. W. TUTT. June, 1893.

CURRENT NOTES.

In the *Ent. Mo. Mag.*, 1891, p. 244, Messrs. Douglas and Newstead differentiated the Coccids, *Lecanium hesperidum* and *L. lauri*. Mr. Maskell, in the May number of the same Mag., questions their distinctness, and suggests that *L. lauri* will have to be merged into *L. hesperidum*.

We are aware that a large body of collectors of Lepidoptera do not pretend to be scientists, and yet they make a number of useful observations. There are a few who collect insects much in the same manner, and probably for the same reason, that many residents of the London slums catch birds. For the latter class Dr. Knaggs is writing what apparently means to be a comprehensive article in *The Entomologist*. Butterflies are to be caught with artificial decoys, consisting of butterflies' wings glued to springs. We expect to read next month of a net to be pulled with a string from a distance, of a second string to work the wings of the decoy, and a general parallel to other bird-catching

requisites. Truly entomology of this kind must do us a great amount of harm, and reduce us, in the opinion of the public, to the general level of the Whitechapel bird-catcher. Some of us are near enough that level now. It were better, it appears to us, that educated men should attempt to raise instead of lower the general tone of entomology.

Mr. Chitty describes a black form of *Telephorus figuratus*, and proposes the varietal name of *cruachanus* for it, the variety having been found near Ben Cruachan.

Mr. McLachlan, in his Presidential Address to the West Kent Nat. History Society, Feb. 1893, suggested a close time for some species of butterflies, as is now the case with some birds. The species specially referred to as requiring this treatment are *Lycæna arion* and *L. acis*, which he suggests are probably approaching extinction in Britain through over-collecting. We wonder what will be thought of this idea by those who are at present devising decoys, springs, &c. for the more certain wholesale capture, and the consequent more certain extermination, of our rarer butterflies. Although we look on the idea as rather Utopian, it is certainly a move in the right direction, in the present days of over-collecting.

Mr. Newstead has provisionally named a Coccid, taken in a "nest of *Formica nigra* at Chesil Beach," and which he believes to be new, *Lecanopsis formicarum*.

Mr. Robson promises to answer the criticism on "Is Moisture the cause of Melanism?" and published in our last issue, at some future date. We are curious to learn what further views Mr. Robson has on the subject of "Melanism," and can promise to give them our most careful attention when they appear.

Our readers will hear with pleasure that Mr. E. B. Poulton, M.A., F.R.S., F.E.S., has been elected to succeed the late Professor Westwood as Professor of Zoology at Oxford.

NOTES ON COLLECTING, Etc.

CANNIBALISM IN LARVÆ OF CALLIMORPHA HERA.—*Callimorpha hera* larvæ appear to show a slight tendency to eat each other. About five or six have been devoured by their comrades. This operation has so far been always performed when the victim was changing its skin and so defenceless, though one was injured in its normal state. I have not on my mind another instance of a hairy larva which is a cannibal, but I daresay there may be others. They feed at night, and if they take a fancy to eating a comrade, they do not leave much more of him by the morning than would be left if he were to moult and leave the old skin.—A. ROBINSON, Mitre Court Buildings. April 24th., 1893.

CANNIBAL HAIRY CATERpillars.—In reference to the interesting note by Mr. Sydney Webb on p. 157 of the May *Ent. Record* about the larva of *Arctia caja* sometimes making a meal off the pupa, I may mention that I have noticed exactly the same habit in the case of *Amblyptilia acanthodactyla*. Last autumn, being anxious to make some observations on the larvæ of this "Plume," I took the opportunity of their being exceptionally abundant, and collected some hundreds of them, over which a careful watch was kept. Although the larvæ did not appear ever to attack one another, they certainly devoured some of

the newly-formed pupæ, and yet there was no scarcity of their natural food to account for it. Curiously enough, only yesterday, when I was in the New Forest, I opened a rolled-up leaf, inside which was a fair-sized Macro larvæ with its head almost touching the remaining portion of a freshly-eaten Tortrix pupa, and on the very strong circumstantial evidence, any jury would have brought in a verdict of "guilty." Unfortunately, the offending larva had better remain nameless, for before I was able to examine it satisfactorily, it slipped off the leaf and disappeared.—EUSTACE R. BANKES, The Rectory, Corfe Castle. *May 20th*, 1893.

COLIAS EDUSA AT SEATON.—A female *Colias edusa* was captured on the beach here on Saturday, 27th May, and another seen on June 2nd. —JOHN N. STILL, Seaton. *June 5th*. [Our correspondent has sent us a specimen. Probably, as on previous occasions, we are to have this species two consecutive years with us. At any rate it would appear that a few of the many imagines which occurred last autumn were able to hibernate. Of course, last winter was most favourable, and gave the imagines every opportunity of undergoing the ordeal.—ED.]

NYSSIA HISPIDARIA AT READING.—On March 5th I took a fine ♂ *N. hispidaria* at rest near here, which is a welcome addition to our list.—A. H. HAMM, 24, Hatherby Road, Reading.

PRIOR EMERGENCE OF MALE LEPIDOPTERA.—The relative time of emergence of the male and female insect has been discussed of late. I noticed recently a striking example of males coming out first in the case of some bred *Epione advenaria*. Fifteen ♂s emerged between March 24th and 30th, and between the latter date and April 10th some twelve imagines put in an appearance, all of which were ♀s, except one other male on April 1st. My attention was called to the point because, wishing to continue the race, I was looking each day for a female to pair.—W. S. RIDING, Honiton. *April 18th*, 1893.

NOTES OF THE SEASON.

King's Lynn.—Despite the prevalence of cold easterly or N.E. winds and very cold frosty nights, I find several species emerging earlier than usual. For more than a week we have had a frost nearly every night, but the days have been sunny and fairly warm. On the 4th of this month I noticed *Tephrosia punctulata* (2 specimens) at rest on alder trunks, nearly a month earlier than I have ever met with them here. *Brephos parthenias* was out on March 5th, and on the 12th was very plentiful, and continued on the wing during the month. So far my best take has been a series of *Steganopteryx pygmaæana* among the spruce fir, but in consequence of N.E. winds, this species was much more difficult to get this year than last. The superabundance of Aphides on birch has well nigh caused me to give up collecting the species of *Micropteryx* found here. For the time of the year I never saw Aphides so plentiful, and as the winged females are now appearing, I fear that unless we soon get rain, these insects are likely to continue a source of annoyance to the collector of lepidoptera.—E. A. ATMORE. *April 10th*, 1893.

Swansea.—Nothing started pretty early here this year. I took my first sawfly frequenters on March 6th, *Tamocampa munda* and *populeti*, the latter being new to this district, *vide* list in February number of *Ent. Record*. I have also added to the same list, *Larentia multistrigaria*

at light; *Tæniocampa munda*; *T. opima* at light; *Asphalia flavicornis* at rest; *Brephos parthenias* flying in sunshine; *Hemerophila abruptaria* at light; *Anticlea badiata* at light; *Eupithecia nanata* at light; and omitted to mention in last list, *Anticlea derivata* at rest, and also *Phigalia pilosaria*. I took my first *Tephrosia crepuscularia* on March 8th, a month earlier than last year, and have since turned up some very nice dark varieties, though they seem much scarcer than last year. We may get some later on, as the continued fine weather and no rain is probably keeping the insect from emerging. On March 12th I took a very nice black variety of *Phigalia pilosaria*; it is the only variety of this species I have ever seen, though it may be common in some places. I have taken the type freely in Berks and Hants. On the 14th I took *Tephrosia consonaria* and *Argynnis euphrosyne*, which I think extremely early, at least in this locality. The nights have been very bad for my moth traps. I have only had one successful night, viz. on March 7th, on which I took *Hemerophila abruptaria* (1), *Lobophora lobulata* (3), *Amphidasys prodromaria* (2), *Tæniocampa munda* (1), *T. opima* (2), *Pachnobia rubricosa* (1), *Selenia illunaria* (2), *S. illustraria* (1), *Eupithecia nanata* (1), *Cilix spinula* (1), *Calocampa exoleta* (1), *C. vetusta* (1), *A. badiata* (3), *L. multistriata*, *Eupithecia abbreviata*, with plenty of *T. gothica*, *instabilis*, *cruda*, *Hybernia progemmaria* and *Anisopteryx æscularia*. There has been a frost every night since, so I have taken nothing.—R. B. ROBERTSON. April 14th, 1893.

Tyrone.—The season is three weeks early here! *Numeria pulveraria*, *Eurymene dolobraria*, *Macroglossa bombyliiformis* and *Ptilodontis palpina*, were taken on the 4th of May. Usually they appear in the first week of June here.—W. F. DE KANE, Monaghan. May 5th, 1893.

Clevedon.—Insects are very early this season. The GEOMETRÆ are especially plentiful at present; NOCTUÆ not so plentiful, neither do any of the last-named yet affect sugar. The long-continued drought is productive of a vast amount of honeydew (even the common *Mercurialis* is covered with it); this being so, we must not look for much success with the sugaring tin, at any rate for a time. I suppose we may look with certainty to have a second brood of many species of insects this season in consequence of the unusually early appearance (three weeks) in some cases. I took a few specimens of *Asthenia blomeri* the last week in April, and saw *Drepana unguicula* on the wing the latter end of the second week in the same month.—J. MASON. May 10th, 1893.

Wicken.—I was collecting at Wicken last Saturday and Sunday (the 6th and 7th May), where I found *Papilio machaon* out in fine condition, and flying in fair numbers in the Fen. The warm weather has brought the insect out very early this year, as I heard that it had been seen as far back as a fortnight before my visit, and the females had already begun to deposit their ova. Larvæ of *Lasiocampa quercifolia* were also to be found of various sizes. I took thirteen, varying from about $1\frac{1}{2}$ -inches to $4\frac{1}{2}$ -inches in length. This is a fairly easy larva to find when one has once got used to its appearance. It is to be found resting on buckthorn and willow bushes, quite near the ground, amongst the grass and reeds, and generally seems to prefer small bushes to large ones. Unfortunately, the nights were clear and cold, with an east wind, which made sugar and light quite useless, the only insects which came to sugar being two *Gonoptera libatrix* (the one which I bottled

being in absolutely perfect condition, rather surprising for a hibernated insect taken so late in the spring); two *Apamea gemina*, one *Tenio-campa gothica*, one *Tenio-campa gracilis* and one *Noctua rubi*. *Meliana flammea*, I was informed by Mr. Bailey (a local collector, who rendered me much valuable assistance) was nicely out, but owing to the cold nights I did not try light, and consequently saw none. Digging at the roots of poplars produced one pupa of *Trochilium apiformis*, though the traces of the larvæ were apparent in many of the trees. Of the common butterflies, *Pieris brassicæ*, *rapæ* and *napi* were of course in abundance during the hot sunshine, and a good many *Euchloë cardamines* turned up, with a few *Pararge megæra* in the lanes. One or two *Ematurga atomaria* in the Fen, and single specimens each of *Euclidia ni*, *Melanippe sociata* and *Anticlea badiata*, with a couple of young larvæ of *Bombyx quercus*, completes the list of insects taken. Not a very grand one for Wicken.—HENRY A. HILL, 132, Haverstock Hill, Hampstead, N.W. May 11th, 1893.

Southend.—I was at Southend from April 17th to May 11th, but owing to the almost continuous north-easterly gales, my captures were not very large. Some of the dates are very early for the respective species, the following being the most noticeable:—April 18th, *Polyommatus phlæas*, *Syrichthys malvæ*, and *Clix spinula*; April 19th, *Strenia clathrata*, *Eupithecia centaureata*, *E. coronata* and *Psyche radiella*; April 24th, *Argynnis euphrosyne*; April 25th, *Lycæna alexis* and *Chortobius pamphilus*; April 27th, *Viminia rumicis* and *Cuspidia megacephala*; April 29th, *Cuspidia psi*, *Satyrus megæra*, *Agrotis exclamationis* and *Grammesia trilinea*; May 1st, *Hadena genistæ*; May 3rd, *Aspilates citraria*. *Anthocharis cardamines* was very plentiful near Benfleet, and I also found the ova on the flower stalks of *Erysimum allaria*. My other captures included *Hemerophila abruptaria*, *Acidalia promutata*, *Eupithecia abbreviata*, *E. pumilata*, *Tenio-campa gracilis*, and a few larvæ of *Bombyx quercus*, *Odonestis potatoria*, *Trichiura crategi*, *Arctia villica*, *Diloba cæruleocephala*, *Phorodesma smaragdaria*, &c. Some of the larvæ were very forward. *Eriogaster lanestris* in second skin, on April 19th, *Vanessa urticæ* full fed on 6th May, and many others. I think some of the latter species must have passed the winter in the pupa state, for they were quite fresh, and are easily separated from the tattered, hibernated specimens. Mr. Platt, of Chipping Norton, sent me some pupæ full developed, about Christmas time, but they failed to emerge; possibly it was the railway journey that killed them.—A. U. BATLEY, 28, Amhurst Park, N. May 12th, 1893. [We do not think the suggestions re *Vanessa urticæ* at all probable.—Ep.].

Seaton.—We have had sunshine here since 1st March, and some extremely hot nights, when insects appeared in great quantities round the lamps, many species very much before they were due. *Argynnis euphrosyne*, numerous since 27th April. *Pararge egeria* and *P. megæra* since April 13th. I took *Hepialus lupulinus* on April 25th. On 14th May, I noticed fourteen different species of butterflies in two hours; including one *Colias edusa* and one *Vanessa polychloros*, at light. *Demas coryli*, *Arctia villica* and *Dasychira pudibunda*, are very numerous now. I also took *Notodonta chaonia* and *N. dodonea*. Many June Nocturæ I captured, night after night; the best of many good species being *Dianthæcia albimaculu*, the food-plant (*Silene nutans*) growing here. Geometers and many species of the Micro-lepidoptera are equally numerous and early.—JOHN N. STILL. May 12th, 1893.

Horsley.—South London Entomological and Natural History Society.—Field Meeting held on Saturday afternoon, May 13th, at Horsley, six miles from Guildford. The members assembled at Waterloo about two o'clock, as the Committee had arranged, and after an hour's pleasant ride, mainly through a fine collecting district, we arrived at our destination. No arrangements had been made for a set tea, so we all proceeded to fortify ourselves in various ways for the loss, with the full intention to work till dark prevented us. The first capture, I believe, was *Euchloë cardamines*, L., on the roadside near the inn, and quickly nets were swinging in all directions for *Emmelesia albulata*, Schiff. was crossing the road in numbers. We entered the field to the right, and were soon busy with the pretty but swift *Heliaca tenebrata*, Scop. Here were more *E. cardamines* with *Pieris napi*, L., *Syrichthus malvæ*, L. and *Nisionades tages*, L.; somewhat worn *Polyommatus phlæas*, L.; *Lycæna icarus*, Rott. and *Cænonympha pamphilus*, L., freshly emerged; *Euclidia mi*, Clerck, *E. glyphica*, L. and *Pyrausta purpuralis*, L., in their usually damaged state; and, of course, the two pests, *Crambus hortuellus*, Hb. and *C. pratellus* were well in evidence. Adjoining these fields was a shady pond, which produced, among other treasures, several species of *Agabus* to our only Coleopterist. Proceeding along the edge of the wood many Geometers were driven out; *Lomaspilis marginata*, L., *Cabera pusaria*, L., *Acidalia remutaria*, Hb. and *Asthena candidata*, Schiff., in good condition; one or two *Bapta temerata*, Hb., and a single *Zonosoma annulata*, Schulz were captured. The larvæ of *Cleora lichenaria*, Hufn. were searched for, but failed to put in an appearance. Almost every bush of spindle was swarming with the larvæ of *Hyponomeuta evonymella*, L. A short lane produced the lovely nest of a Wood Warbler (*Phylloscopus sibilatrix*, Bech.) with seven eggs. Close by, among some young birch and under wood, *Euchelia jacobææ*, L., was in full force, and an odd *Pararge megæra*, L. was noted with *Melanippe montanata*, Bork. Here, too, our bôtanists got rewarded, for spikes of *Orchis mascula*, L. were found with *O. maculata*, E. not yet in flower. Wandering through the fields, the beautiful larvæ of *Diloba cæruleocéphala*, L. were seen defoliating the sloe and *E. albulata*, Schiff. was in swarms flying over the grass in the field next the Guildford Road. Geometrina larvæ, including the beautiful *Hybernia defoliaria*, L., seemed plentiful wherever any beating was done. Crossing the road by the church, we took the path leading to the Sheep Leas. Under the beech trees on the right were many spikes of *Cephalanthera grandiflora*, Bab., with a few *Listera ovata*, Br. There was also *Daphne laureola*, L. When the open Leas were reached, there were the "blues," *L. astrarche*, Bgstr. and *L. icarus*, Rott., with *C. pamphilus* in large numbers, gradually seeking rest, as the sun went down, on tall stems of grass and other elevated coigns of vantage. On our return these were all quiet, and vars. were eagerly sought, but success was nil; at the top of the Leas more than two dozen were counted on the dead flower spikes of burdock. A plant of deadly nightshade (*Belladonna atropa*, L.), which, on a former visit of the Society, was more than seven feet high, was again rearing its head, and on an old stump near, the allied *Solanum nigrum*, L. was growing. All the burdock leaves around this part were well riddled by the larvæ of *Acipitia galactodactyla*, Hb., and a few late ones were found by the searchers. Now we dispersed, and afterwards, when

comparing notes, several additional species were added to our lists, including one *Epione advenaria*, Hb. One *Bapta bimaculata*, Fb., *Bupalus pinaria*, L., *Cidaria associata*, Bork., *Phytometra viridaria*, Clerck (*ænea*, Hb.), *Iodis lactearia*, L., *Ematurga atomaria*, L. and *Strenia clathrata*, L. were recorded; *Anaitis plagiata*, L. and *Botys hyalinialis*, Hb. were just emerging; specimens were also taken of *Botys fuscalis*, Schiff (? Ed.), *Xanthosetia hamana*, L., *Cidaria corylata*, Thnb. and *Melanippe rivata*, Hb. Our micro-lepidopterists, among other things, noted the cases of *Psyche hirsutella*, Hb. (*fusca*, Sta.), and imagines of *Carpocapsa grossana*, Haw. *Eupæcilia ciliella*, Hb., *Glyphipteryx fuscoviridella*, Haw., and *Elachista argentella*, Clerck (*cygnipennella*, Hb.). Our return over a portion of the same ground was more productive in specimens, but only *Phalera bucephala*, L. and *Zonosoma linearia*, Hb. (*trilinearia*, Bork) were new. The inner man now needed attention, and although the accommodation was but meagre, ample justice, as is usual with our members, was done to what was put before us. The walk to the station through the quaint village produced a specimen of *Melanthia ocellata*, L., and two of our number who had gone to the rhododendrons, reported that, to their disgust, all were burnt, together with much of the surrounding forest. Our journey home was most pleasantly spent in relating experiences, and I believe all returned thoroughly pleased with the outing, and heartily wishing that the next field outing, to Oxshott on June 10th, under the able guidance of Mr. R. South, may be both as enjoyable and as successful as this one had been.—HY. J. TURNER (on behalf of the Committee).

Weymouth.—The most striking instance that I have noticed (in the very little collecting that I have done), of the earliness of the season, is that *Steganoptycha subsequana*, which is generally not out until the beginning of May or the extreme end of April, was quite worn, and almost over at the latter date.—N. M. RICHARDSON. May 18th, 1893.

North Ozon.—During a week spent at Whitsuntide, near Enstone, the weather was rather unsettled, and sugar proving entirely useless. I did very little among the NOCTUÆ. Geometers were, however, flying freely at dusk, and I took a stroll round the hedges and lanes every suitable evening; the commonest species by far was *Melanippe montanata*, which seemed always ready to fly, day or night. *Cidaria russata*, with several varieties, including *centum-notata*, was also common, as was *M. sociata*. Amongst other species beaten out were *Asthena luteata*, *Abrazas ulmata* (singly), *Phibalapteryx tersata*, *Larentia pectinataria*, *Emmelesia decolorata*, *A. candidata*, *Melanthia ocellata*, *Cidaria suffumata* (very worn), *Camptogramma bilineata* (first occurred May 24th), *Cidaria corylata*, etc. Altogether during the week, I observed over 25 species of Geometers, within a radius of a few hundred yards of the farmhouse where I was staying. NOCTUÆ were flying in plenty, but were not attracted to sugar, the only capture was a very dark *Xylophasia rurea* var. *combusta*, which, from its condition, had been out some time. A day spent at Wychwood Forest, on Whit-Monday, resulted in the capture of about 30 *Nemeobius lucina*, mostly rather faded; evidently this local species was, like most others, out much before its usual time. Larvæ seem very plentiful, and the trees show traces of their ravages on all sides. *Hepialus humuli* was first noticed about the fields on May 24th, and I captured a very large ♀, conspicuously larger than any in my series. *H. lupulinus* was very common, darting about most

actively. I observed one very evident case of "assembling" in this species, in which several males were settled quietly round, in a very small space, and others, wildly dashing about; only one ♀ was observed.—ALBERT J. HODGES. May, 1893.

New Forest.—The following larvæ were captured by myself, and members of the North London Natural History Society, on May 19th, at Lyndhurst.—On oak: *Thecla quercus* (not common); *Psilura monacha* (several), *Cymatophora ridens* (very common), *Cosmia trapezina* and *Tæniocampa stabilis* (very common), *Agriopis aprilina*, *Ennomos angularia* (several), *Amphidasys prodromaria* (several), *Nyssia hispidaria*, *Phigalia pedaria*, *Himera pennaria*, *Hybernia defoliaria* (not plentiful), *Eupithecia abbreviata* (several). On birch: *Cymatophora flavicornis* (between the leaves), *Selenia illustraria*, *Geometra papilionaria* (occasionally), *Brephos parthenias*. On elm and willow: *Vanessa polychloros* occurred in profusion, with an occasional *Argynnis paphia*.—AMBROSE QUAIL, Stamford Hill, N. [Surely not *paphia* on elm and willow.—ED.].

North Devon.—Last year was an exceptionally good season here from a collector's point of view, but this bids fair to surpass it, with the exception that not one hibernated *Cynthia cardui* or *Colias edusa* has, so far, put in an appearance. Butterflies have been very plentiful, and weeks earlier than I have ever known them; the following is my list of "First Notices":—March 10th, *Vanessa urticae*; 20th, *V. io*; 23rd, *Lasiommata egeria*; 25th, *Pieris rapæ*; 29th, *Gonopteryx rhamni*; 30th, *P. brassicæ*. April 7th, *Euchloë cardamines*; 11th, *Lasiommata megæra*; 14th, *Thanaos tages*; 15th, *P. napi* (probably out before, but the first one caught); 16th, *Syrichthys alveolus*; 19th, *Chrysophanus phlaeas*; 20th, *Argynnis euphrosyne*, *Leucophasia sinapis*, *Lycæna icarus*, *L. argiolus*; 23rd, *V. atalanta*; 25th, *Ctenonympha pamphilus*; 27th, *Melitæa artemis*, *M. athalia*, *A. selene*. May 4th, *Hesperia sylvanus*; 26th, *Hipparchia janira*; 28th, *A. adippe*. The following insects—*T. tages*, *L. megæra*, *P. brassicæ*, *L. icarus*, *A. selene* and *H. janira* being actually as early, or earlier than I took them at Biarritz, in 1891. *A. euphrosyne* has been extraordinarily abundant. Sallows promised well, but from the time the fine weather and E. winds set in (March 18th) they proved absolutely useless, and sugar has been a complete failure. Night searching and sweeping for larvæ has also given very poor results. But for one week (May 9th to 15th inclusive), light proved very successful; on the last night, which was the best, there had been a thunderstorm, and heavy showers during the day. The following species were taken:—May 9th:—*Spilosoma menthastris*, *S. lubricipeda*, *Agrotis exclamatoris*, *Grammesia trilinea* (including the red form and var. *bilinea*), *Dianthæcia capsicola*, *Apamea basilinea*, *Odonoptera bidens*, *Cidaria russata* and *Emmelesia decolorata*; 10th, *Cucullia umbratica*, *Viminia runcicis*; 11th, *Plusia chrysitis*; 13th, *Bombyx rubi* ♀, *Arctia villica*, *Leucania pallens*; 14th, *Cilix spinula*, *Hadena dentina*, *H. thalassina*; 15th, *Notodonta trepida*, *N. ziczac*, *Demas coryli*, *L. comma*, *A. rurea*, *M. anceps*, *Caradrina morpheus*, *Rusina tenebrosa*, *A. segetum*, *Noctuæ rubi*, *N. plecta*, *Hadena gemistæ*, *H. pisi*, *Plusia gamma*, *Selenia lunaria*, *Eurymene dolobrararia*, *Ephyra porata*. The moon being just again favourable, light produced last night (June 2nd), the following additional species:—*Miana strigilis*, *Apamea gemina*, *Azylia putris*, *N. triangulum*, *N. c-nigrum*, *N. festiva*, *Xylophasia polyodon* (*monoglyphæ*), *H. oleracea*, *Phlogophora meticulosa*, *Habrostola urticae* (*tripartita*), *mar-*

garitaria, *Thera firmata*, *A. sociella*. I took a freshly hatched *villica* ♂ on April 27th, my earliest previous record being June 7th (in 1887), whilst I have bred them as late as July 14th (in 1888). A pupa of *Triphena pronuba*, dug the day before, hatched on May 16th. Larva-beating has been fairly successful; details would be too lengthy, and dates not so easy to compare as with the perfect insect, but larvæ of *Thecla quercus*, about full-fed on April 29th, are worth mentioning.—K. M. HINCHLIFF, Worlington House, Instow, N. Devon. *June 3rd.*

Lyndhurst.—Last night the thermometer went down to 34°, but it did not prevent me finding a few *Eulepia cribrum*, which are just coming out.—J. C. MOBERLY, 9, Rockstone Place, Southampton. *June 1st, 1893.*

Selby.—The season in Yorkshire has been exceptionally early as elsewhere. I found *Melanippe tristata* well out in Wharnccliffe Woods, on May 22nd; and on the 27th, at Bishop's Wood, near Selby, *Bupalus piniaria*, swarms of *M. montanata*, and many other species, which ordinarily we do not see here until the middle of June.—Geo. T. PORRITT.

Wicken, Chippenham, Tuddenham.—Tempted by the success achieved by those early in the field last season, and further encouraged by reports from the Fens, of *Meliana flammea*, captured the last week in April, and *Papilio machaon* "everywhere," I left town for Wicken Fen May 15th, upon a short visit of inspection, and with the view of making arrangements for a longer visit, in which I was to be accompanied by Mr. and Mrs. Abbott, of Four Oaks, Birmingham. The glorious weather of the previous two months was rapidly drawing near its end, and cold winds and dull days seemed in store. Putting up temporarily at the "Maid's Head" Inn, I lost no time in seeking (for the first time in my collecting career) for professional aid, and made arrangements with Mr. Houghton, for the use of his lamp and sheet, not to mention the advantage of his long experience and intimate acquaintance with all the good things to be taken here. Alas, for human expectation, the weather defied our efforts, light proved almost useless; half-a-dozen *M. flammea* only being taken in two nights, whilst sugaring resulted in the capture of the common or "barn-door" *Agrotis exclamationis*. The same warm and dry weather which caused the early emergence of the June Noctuidæ, seemed to have delayed the appearance of the day-flying species, for which Tuddenham, and other spots in the neighbourhood, are so famous, and although I deferred my expeditions to these rich localities until my second visit, with the view of sparing at least, a few *Agrophila sulphuralis*, until the arrival of my friends, unfortunately, neither this species, nor *Acidalia rubricata*, were to be seen as late as June 3rd, and from the extreme sparseness of the vegetation upon the dry sandy soil of Tuddenham, it seemed likely to be very much later before any number could be expected, whilst a bad season for them is quite a probability. A visit to Chippenham Fen (for permission to work same, I am indebted to the courtesy of Mr. Tharp, of Chippenham Park), on June 3rd, under the guidance of Mr. Cross, of Ely, proved the only day in which anything approaching a good day's work was possible. *Bankia argentula* was out in fine condition and considerable numbers, and we all secured good series, which were hailed with delight, as at last promising occupants for the temporary tenure of the very eligible sites upon our numberless empty

setting boards. *Hydrellia unca* was scarce, and only just emerging; we captured two only. *Euclidia mi*, *E. glyphica* and *Phytometra anea*, with *Fidonia atomaria*, were also seen with great satisfaction, as the salient feature of our experience of the Fens, up to this expedition, had been the complete absence of even the commonest day-flying species. Not satisfied with one blank visit to Tuddenham, we embraced the early chance of a more favourable day to repeat the trial, but with a precisely similar result; and a visit still later, by another entomologist, in company with Mr. Houghton, resulted only in the capture of one *Lithostege griseata*, which was also fully due out. A good series of *Hecatera serena*, quite fresh, was obtained at rest upon pine trunks round Tuddenham, and even this common species was hailed with delight. Towards the end of our stay (which terminated on June 6th), sugar proved too great an attraction to be resisted by *Aplecta advena*, of which a good series in fine condition was secured, but this species is here curiously local, one "drove" being much more prolific than other localities tried. Amongst other captures at sugar were:—*Neuria sappanaria*, *Apamea unanimitis* (scarce); *Rusina tenebrosa*, *Axylla putris*, and several other commoner species in fair numbers, but all of which, excepting *A. unanimitis*, are regular visitors to my sugar at Freshwater. A few *Cherocampa elpenor* visited the sugar, and a fine series of *Eupithecia rectangulata* was taken off apple trunks, after dark, by careful searching. An account of our stay here would be incomplete without allusion to "the" lamp, which, though commencing its career under very inauspicious circumstances, will be heard of again. Mr. Abbott, to whose fertile brain the juvenile Eddystone owes its conception, could never be persuaded to abandon his faith in its powers of ultimately overcoming at some late period of night, the adverse influence of easterly winds or heavy dews; and we waited patiently in its cheerful radiance for the *Macrogaster arundinis* which never came, and the good Fen "Wainscots," which (with the exception of one more *M. flammea*, and one *Leucania pudorina*), declined to be fascinated to their doom. We had one fairly suitable evening, when a few *Herminia cribralis* fluttered round early, whilst between 9.0 p.m. and mid-night, an occasional insect appeared, to incite us to the exercise necessary to revivify our chilled frames; but of these, *Notodonta ziczac* and *Smerinthus populi*, with the two above-named specimens, were the most noteworthy. As the proverb promises a good ending to a bad beginning, it is to be hoped that our next visit to this undoubted *El Dorado*, may at least give us some capture worthy of record. Of larvæ, we observed amongst internal feeders, *Chilo phragmitellus* full-fed, with pupæ, and towards the end of our stay, a few imagines; also nearly full-fed, an abundance of *Calamia phragmitidis*, whilst at Chippenham the beautiful green larva of *Plusia orichalcea* was to be taken, but was more rare than in other seasons. During a short visit to Ely, I was very pleased to obtain, in old reed seems, one or two pupæ of *Leucania obsoleta*, one of which promptly emerged and proved a very fine specimen. We obtained at the same time what I believed to be pupæ of *Leucania straminea*, and also full-fed larvæ of *Calamia phragmitidis*. On our way back to town, a stay was made for one evening's work in the neighbourhood of Ely, when, owing to the kindness of Mr. Cross in showing us his locality, we were fortunate in netting at dusk two more *Leucania obsoleta*, and one fine *Senta ulvae*, but were rather early for

both species.—ALBERT J. HODGES, 2, Highbury Place, N. June 8th, 1893.

Howth.—I was at Howth with Mr. Harker at Easter in splendid weather, though rather too dry and clear for larvæ hunting. We found *Epura lichenæ* fairly numerous, but little else except *Noctua xanthographa* and *Triphæna orbona*. *Stilbia anomala* was scarce; only three specimens were taken owing to the very dry state of the ground. *Satyrus semele* larvæ were fairly common in little tufts of *Aira cespitosa*. We saw a few *Pieris rapæ* and *Vanessa urticæ* flying about in the hot sunshine, and we obtained a few pupæ of *Hypsipetes impluviata*, and a few *Nocturæ* at the roots of alder and birch.—H. BICKERTON JONES. April 11th, 1893.

Reading and Swansea.—This long spell of sunshine has been favourable for day collecting, but most of the night work has been bad. *Endromis versicolor* turned up well for a few days. *Leucophasia sinapis* was wonderfully common, but *Nemeobius lucina* rare; something did not suit it. Larvæ of *Toxocampa pastinum* proved much harder to obtain in spring than they were last autumn. I have not been able to look them up myself since winter, but my brother went to the locality twice, and got about 50 after long search. Last autumn when I was there I gathered them at the rate of 150 per hour. I was at Swansea just in time for the beautiful black form of *Tephrosia bimodularia*, which appears much more common there than the ordinary pale form. I got a grand series. It was a new experience, too, for me to catch *Macroglossa bombyliiformis* without having to pick them out from *M. fuciformis*, but the latter, it seems, does not occur there. *Melitæa artemis* is having a good time this year; it is everywhere in swarms at Swansea. Larvæ, too, are uncommonly abundant. Just now, in some of the woods near Swansea, the trees are almost defoliated, and it is the same about Reading. I found several *Stauropus fagi* near Swansea, but can only hear of two or three having been taken at Reading while I was away. In my pupa boxes, however, they have been emerging well, better than ever before.—W. HOLLAND, Reading. May 16th, 1893.

Enniskillen.—*Nocturæ* seem very plentiful on the wing, but do not appear to come to sugar in a satisfactory manner. I have tried it three times. The first night was blank; the second night, 1 *Viminia rumicis* was attracted; third night, 1 *V. rumicis* and 1 *Xylophasia rurea*. Thorn bloom is, however, abundant everywhere, which may be a counter attraction. E. W. BROWN. May 20th, 1893.

New Forest.—I have been away for a trip to the New Forest, and can record a pretty successful week's work, though most of my captures were larvæ. The principal imagos captured were *Macaria alternata* (few), *Hypsipetes impluviata* (common, but some much worn), *Tephrosia roboraria* (a nice series), *Limenitis sibylla* (just out on June 1st, three weeks earlier than usual), *Gnophria rubricollis* (a few). I did not see *Moma orion*. Of larvæ I took *Macroglossa bombyliiformis* (a few) *Asphalia ridens* (in great numbers, I stopped taking them), *Amphidasys prodromaria* (common), *Eupithecia irriguata* (fair numbers), *Notodonta chaonia* (about a score), *Ennomos erosaria* (a few), *Selenia illustraria* (one or two), *Ennomos angularia* (a few), *Notodonta trepida* (a few very small), *Bombyx trifolii* (a few), *Liparis monacha* (several), *Demas coryli* (a few).—A. ROBINSON, 14, Rossetti Mansions, Chelsea, S.W. June 9th, 1893.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—*May 10th, 1893.*—Mr. R. McLachlan exhibited, for Dr. Fritz Müller, of Blumenau, Santa Catarina, Brazil, specimens of larvæ and pupæ of a dipterous insect, *Paltostoma torrentium*, and read a letter from Dr. Fritz Müller on the subject. The writer stated that these larvæ were of the same nature as those exhibited by Mr. Gahan, at a meeting of the Society in October, 1890, and which were then thought by Lord Walsingham and Mr. McLachlan, to be allied to the Myriapoda. Mr. Gahan, Mr. Jenner Weir, Colonel Swinhoe, Mr. Blandford, Mr. Verrall, Mr. Slater and Mr. Jacoby took their part in the discussion which ensued (*cf. Proc. Ent. Soc.*, 1891, p. ii). Mr. S. G. C. Russell exhibited *Hesperia alveolus* var. *taras*, taken by him at Woking in April last. Mr. J. M. Adye exhibited a long series of *Moma orion*, *Eurymene dolobraria*, *Amphidasys betularia*, and *Hylophila prasinana*, and a few specimens of *Notodonta dodonæa*, *N. chaonia* and *N. trepida*, *Acronycta alni*, and *Selenia illustraria*, all bred by him in March and April last, from larvæ obtained in the autumn of 1892 in the New Forest. Mr. H. Goss read a copy of a letter received by the Marquess of Ripon, at the Colonial Office, from the Governor of the Gold Coast, reporting the occurrence of vast swarms of locusts at Aburi and Accra, West Africa, about the middle of February last. The writer stated that at Accra the swarm extended from east to west as far as the eye could see, and appeared to occupy a space about two miles wide. Colonel Swinhoe stated that some years ago he had been requested by the Indian Government to report on plagues of locusts. He said he had witnessed swarms of these insects far larger than the one just reported from the Gold Coast, and mentioned that many years ago, when going up the Red Sea in one of the old P. and O. paddle-boats, the boat had frequently to stop to clear her paddle-wheels from locusts, which had settled in such swarms as to choke the wheels and stop their action. Mr. C. G. Barrett called attention to a field excursion to the Cotswolds, which it was proposed to have in June. Fellows of the Society were requested by the President to communicate to Mr. Barrett, as early as possible, their views as to the date which would be most generally convenient for such excursion, and to offer any other suggestions on the subject which might occur to them. Mr. E. C. Reed, of Valparaiso, Chili, communicated a paper, entitled, "Notes on *Acridium paranense*, the migratory locust of the Argentine Republic." Colonel Swinhoe, Mr. Champion, Mr. Elwes, Mr. McLachlan and Mr. Merrifield took part in the discussion which ensued. Professor L. C. Miall communicated a paper, entitled, "Dicranota; a Carnivorous Tipulid Larva." Dr. T. A. Chapman communicated a paper, entitled, "On a Lepidopterous pupa (*Micropteryx purpurella*) with functionary active mandibles." Mr. McLachlan said Dr. Chapman's observations were of great value, and tended to show that the position of *Micropteryx* was still nearer the Trichoptera than had been supposed. The President announced that the new Library Catalogue, which had been edited by Mr. Champion, with the assistance of Mr. McLachlan and Dr. Sharp, was now ready for sale to the public at 9s., and to the Fellows of the Society at 6s. a copy.—H. Goss, *Hon. Sec.*

June 7th, 1893.—Mr. W. C. Boyd exhibited varieties of *Fidonia piniaria* and *Thecla rubi*, taken at Bournemouth on May 20th, 1893. Mr. C. O. Waterhouse exhibited certain large galls on oak leaves from Mexico, one of which was apparently produced by a species of *Cynipidæ*. Mr. W. M. Christy exhibited a series *Zygæna trifolii*, including very many yellow forms, all with one exception, taken at one spot during the latter half of May, 1893, and belonging to one colony. Some of the specimens were more less incomplete, both in structure and colour, and Mr. Barrett stated as his opinion that this was due to their having been forced by the unusually fine weather. Lord Walsingham, Mr. Merrifield, and others took part in the discussion which followed. Canon Fowler exhibited cocoons and specimens of *Coniatus suavis* var. *chrysochlora*, Luc., taken by Lord Walsingham in great abundance on the flower-shoots of tamarisk in the West of Italy. Mr. Chitty exhibited black varieties of the following Coleoptera from the slopes of Ben Cruachan, N.B.:—*Carabus violaceus* and *arvensis*, *Pterostichus versicolor*, *Phylloperitha horticola* and *Telephorus figuratus*, and stated that the latter seemed a permanent race, as it occurred both in 1892 and 1893. The President remarked on the great abundance of *Coleophora laricella* in Gloucestershire, and stated that they were committing great ravages among young larches. Lord Walsingham stated that he had seen young larches at Carlsbad completely bleached by this moth. It was suggested by several Fellows of the Society that care should be taken to observe the occurrence of second broods of insects during the year. Mons. Wailly exhibited cocoons of various silk-producing Lepidoptera, and stated that the larva of *Attacus pernyi*, whose food-plant is oak, had been reared in Trinidad on *Terminalia latifolia*.—W. W. FOWLER, *Hon. Secretary*.

SOUTH LONDON ENTOMOLOGICAL SOCIETY.—11th May, 1893.—Mr. R. South exhibited a series of *Diurnæa fagella*, Fb., from Buckinghamshire, the light and dark forms being about equal in number. Mr. South said that the trees in the wood in which they were taken were darker on their western side than on their eastern, and at the time he collected these specimens, the wind was in the east, and most of the moths were at rest on the western side of the trees, the dark insects being inconspicuous, and he thought that if this often happened when this species was on the wing, it would, by natural selection, tend to produce a darker race. Mr. Barrett, in referring to the breeding of *Bombyx castrensis*, L., in captivity, said the larvæ should be well wetted at times, and exposed, when possible, to the sun, and he thought the absence of the latter in some years might account for the uncertain appearance of this species. Mr. Turner said that he had bred *B. castrensis* very successfully on rose leaves dipped in salt water. The discussion was continued by Messrs. Tutt, Frohawk and South. Mr. Adye exhibited a long series each of *Moma orion*, Esp., *Eurymene dolobroraria*, L., *Amphidasys betularia*, L., *Hylophila prasinana*, Lnc. and an odd specimen of *Acronycta alni*, L., *Notodonta chaonia*, Hb., *N. dodonæa*, Hb., *N. trepida*, &c., the majority having been bred in March and April, indoors, from larvæ taken in the New Forest last autumn. Mr. Tutt said that on the 6th May, *Lycæna bellargus*, Rott. was on the wing in Kent, also *Nemeophila plantaginis*, L., *Euclidia glyphica*, L., &c., whilst pupæ and larvæ of *Vanessa urticæ*, L. were reported for the same date. Mr. Jäger mentioned that *Cidaria truncata*, Hufn. was

now emerging, and Mr. South said that he had bred *Coccyx strobilana*, Hb., from the spruce fir in Buckinghamshire.—F. W. HAWES and H. WILLIAMS, *Hon. Secs.*

Thursday, May 25th.—Mr. Adkin exhibited a bred series of *Cidaria suffumata*, Hb., from Forres, with bred series from Dover and Box-hill, for comparison; also a bred series of *Lobophora carpinata*, Bork. (*lobulata*, Hb.), from Rannoch, including one extreme banded form, with southern series for comparison. Mr. Gerrard, a specimen of *Syrichthus malva*, L. (*alveolus*, Hb.) var. *fritillum*, W. V. from Epping. Mr. C. G. Barrett, a box containing more than twenty species of *Psychidæ* from the continent of Europe, and especially desired to gain more information with regard to these little known and obscure insects. He stated that the larvæ lived in cases, after the manner of the *Coleophora*, on fir, furze, heath, grass and the lichens of trees, rocks and bushes, and that many entomologists considered them to be *BOMBYCES*, not *TINEINA*. Mr. Weir remarked that all the species seemed excessively local, and gave his experience with *P. villosella*, Och., stating that the female did not leave the case, that the eggs were laid and hatched within this shelter, and that most likely the first meal of the young larvæ was the body of their mother. Mr. West, of Streatham, on behalf of Mr. Trenery, a male and female of *Pieris daphidice*, L., captured by a boy at Plymouth (When? Ed.), also a specimen of *Smerinthus tilia*, L., in which the rosy tint was very strongly developed, making a very beautiful var. Mr. Turner, a long series of *Hybernia leucophæaria*, Schiff., from varieties with but few markings on a light ground, to forms which were very dark, with the transverse lines obliterated, selected from various localities near South London; a specimen of *Panolis piniperda*, Panz., from Westerham, in which green was the prevailing colour, also hibernated specimens of *Pterophorus monodactylus*, L., taken on February 18th this year. Mr. Warne, a nodule of kauri gum from New Zealand, enclosing a large Longicorn beetle. Mr. Weir, a species of *Hippoboscidæ* taken from an exhausted House-martin (*Chelidon urbica*, L.), most likely *Stenopteryx hirundinis*; also a mass of eggs and young larvæ from the wild rose (*Rosa canina*), which appeared to be those of *Hemerophila abruptaria*, Thnb. He earnestly requested members to make notes of all unusual occurrences during the present phenomenal season, and report to the Society the results of their observations and experiences. Mr. Adkin remarked that a considerable number of species had appeared in his breeding cages, which had been two years or more in pupa. Mr. Perks, a large specimen of a *Polyporus*, full of Coleopterous larvæ, taken at the Society's field meeting at Horsley. Mr. Turner then read the Report of the Society's field meeting at Horsley on May 13th, which had been so successful and enjoyable.—HY. J. TURNER (*Acting Secretary*).

June 8th, 1893.—Mr. F. W. Frohawk exhibited a variety of *Melitæa aurinia*, Rott., a most remarkable form, especially on the underside, the normal orange-tawny colouring being replaced by fulvous brown, and the markings of the outer half of the secondaries being almost entirely missing; also a somewhat similar aberration of the same species on behalf of Mr. Carpenter. Mr. H. A. Auld exhibited a specimen of *Spilosoma urtica*, Esp., which was deficient in the usual row of black spots down the centre of the body; also a bred series of *Phibalapteryx vitalbata*, Hb. Mr. R. Adkin showed a splendid box of

Asteroscopus nubeculosa, Esp., from Rannoch, bred 1893, two being from larvæ fed up in 1890 and the remainder in 1891; Mr. Adkin stating it was not an uncommon thing for this species to remain two years in the pupa. Mr. Weir referred to the view held by some that certain species resisted any forcing when pupæ, and instanced the second brood of *Pieris napi*, in this respect; Mr. Barrett stated that it was of the utmost importance that a species like *A. nubeculosa* should have the power of delaying its emergence should the weather be too unfavourable. Mr. Weir exhibited a specimen of *Aporia crataegi*, L., one of four taken by him in the early part of June, 1839, at Keymer, Sussex, it being then abundant. In 1840, in the same locality he saw but one, and in subsequent years none at all. This specimen he generously placed in the Society's collection. Mr. Weir also said that large numbers of this species, bred from Continental pupæ, had been liberated in the neighbourhood of Windsor. Mr. Frohawk recorded the extraordinary fact of *Limenitis sibylla*, L. having been taken in the New Forest on the 22nd May.—F. W. HAWES and H. WILLIAMS, *Hon. Secs.*

CITY OF LONDON ENTOMOLOGICAL SOCIETY.—Tuesday, 16th May, 1893.—Exhibits:—Mr. Smith, *Eurymene dolobraria* and *Ephyra trilinearia*, from Epping Forest; one of the latter having the outer line on the fore wings developed into a band. Mr. Battley, living larvæ of *Agriopsis aprilina*, from Rugby, and nine specimens of *Amphidasys betularia*, taken at Stamford Hill, by "assembling" on the previous evening, between 8.30 and 10 o'clock. One of these was very dark, and closely approached the var. *doubledayaria*, the remainder being normal. Mr. Prout, *Anticlea derivata*, from Epping Forest and Darlington, the latter being slightly darker. Mr. Clark, bred series of *Lithosia aureola* and *Hypsipetes ruberata*, and living specimens of *Melitæa artemis*. Mr. Bayne, *Tæniocampa leucographa*, from Aylesbury, and variable series of *T. munda* and *T. instabilis*, from Epping. Mr. Lane, a series of *Papilio machaon*. Mr. Riches, living larvæ of *Agrotis nigricans*. Coleoptera:—Mr. Burrows, *Blethisa multipuncta*, *Clytus mysticus*, and *Philonthus quisquilarus* var. *dimidiatus*, from Hendon. Messrs. Lewcock and Heasler exhibited specimens of the genus *Silpha*, to illustrate the paper. Mr. Lewcock then read, on behalf of Rev. W. F. Johnson of Armagh and himself, a paper on "The Genus *Silpha*," giving special notice of *Silpha atrata* and its vars. *brunnea* and *subrotundata*. A discussion then ensued, and a vote of thanks to Mr. Lewcock and the Rev. W. F. Johnson, concluded the proceedings.

Tuesday, 6th June, 1893.—Exhibits:—Mr. Clark, a bred specimen of *Cerura bicuspis* and cocoon of same; a male *Pieris brassicæ*, with a black central spot on the forewings; some fine confluent forms of *Syrichthius alveolus* from Abbots Wood, and a bred series of *Eupœclia ambiguana* from the New Forest. Mr. Battley, living larvæ of *Anthocharis cardamines*. He remarked that these larvæ were very easy to rear, and fed up very rapidly, arriving at their full size in about four weeks. Mr. Tremayne, living larvæ of *Amphidasys prodromaria*, and others from the New Forest. Mr. Hollis, *Adela viridella*, *Nemophora swammerdammella*, and a bred series of *Ephyra punctaria*. Mr. Gregor, *Abraxas ulmata*, *Ligdia adustata*, *Asthenia blomeraria*, &c. Mr. Bacot, a bred series of *Demas coryli*, including one specimen without the dark central band; also young larvæ of *Saturnia carpinii*. He remarked upon the great variability of these larvæ, and stated that while the green

forms harmonized well with the hawthorn leaves, the black larvæ, when lying side by side on a leaf, completely hid it, and gave it the appearance of a hole in the hedge. Dr. Sequeira, several species of butterflies without the usual spots on the upper side. These included *Pieris rapæ*, *Chortobius pamphilus*, *C. davus* and *Satyrus hyperanthus*. Capt. Thompson, a dusky specimen of *Ennomos angularia*, *Platypteryx falcata* with gold scales, and a living bred specimen of *Phorodesma bajularia*. Mr. Riches, dark specimens of *Hemerophila abruptaria*. Mr. Hockett, a bred series of *Pericallia syringaria*. Coleoptera:—Mr. Clark, *Ocypus cupreus*, *Rhagium inquisitor*, *Balaninus villosus*, &c. Mr. Heasler, *Tiresias serra*, bred from larvæ found under bark at Richmond Park last Christmas. Mr. Pearson, *Blaps similis* and *Sphodrus leucophthalmus*. Mr. Lewcock gave an account of an excursion to Woking and Farnham at Whitsuntide, the chief species observed being *Donacia sagittarie*, *D. linearis*, *Corymbetes tessellatus*, *Cicindela sylvatica* (at North Camp) and *Pachyta collaris* in the hop grounds. Mr. Bacot announced that a batch of eggs found upon privet last year had proved to be those of *Noctua triangulum*.—A. U. BATTLEY and J. A. SIMES, *Hon. Secs.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—*May 8th.*—Mr. Robert Newstead. F.E.S., communicated a paper, entitled, "On a successful method of rearing *Deilephila galii*," in which he gave his experiences of rearing this species in 1888, and stated that cold was fatal to the larvæ, and that forcing was absolutely necessary for the pupæ. The author also added some notes on "Lepidoptera attracted by honeydew." Mr. S. J. Capper exhibited some fine varieties of *Boarmia rhomboidaria*; Mr. Collins, *Hadena suasa* and a Lancashire specimen of *Boarmia abietaria*; Mr. Deville, African *Pieride*; Mr. Sharp, Coleoptera from Wales; Dr. Ellis, Coleoptera from Grahams-town, South Africa; Mr. Stott, a pretty piebald variety of the water shrew (*Crossopus fodiens* var. *remifer*); Mr. Watson, *Papilio nucleayana* and *P. sarpedon*.—F. N. PIERCE, *Hon. Sec.*

BIRMINGHAM ENTOMOLOGICAL SOCIETY.—*April 17th, 1893.*—Messrs. R. C. Bradley, W. Harrison, A. Wainwright, each showed long series of *Bombylius major* from Trench Woods, where it was quite common at Easter. Mr. Wainwright also showed a long series of *Melanostoma ambigua* and other Diptera taken at the same time and place. Mr. A. W. Martineau showed *Prionus coriarius* and other insects from Solihull. Mr. R. Freer read a paper upon "Variation, with special reference to Melanism," and showed insects in illustrations. He said that melanism was due to scales in which he believed granules of pigment were deposited in rows; this he concluded from microscopical observation. He believed that both a deficiency and a superabundance of pigment were pathological conditions, and this he illustrated by reference to the human race. He showed that in those localities—where melanic forms mostly occurred, the conditions of life were not very favourable, such were sea shores, where food plants had low nutritive power, isolated spots, where there was much inbreeding, neighbourhoods of large towns, etc., and he believed that these conditions of life were the cause of pathological conditions with melanic results. He believed pigment to be an expression of energy.—COLBEAN
J. WAINWRIGHT, *Hon. Sec.*

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ABERRATIONS OF BRITISH BUTTERFLIES.

(WITH PLATE).

By C. NICHOLSON.

Papilio machaon.—The somewhat unusual variety of *Papilio machaon* shown on Plate D. (fig. 1) was bred by my friend, Mr. W. H. Jackson, of Walthamstow, in May, 1887, from a pupa obtained from the late Thomas Eedle, of Goldsmith's Row, Hackney Road, which pupa probably came from Wicken Fen. It was recorded in the *Entomologist* for 1888 (Vol. xxi). As will be seen from the plate, the two larger black costal blotches are united. The other markings and colour are normal.

Polyommatus phlæas.—Fig. 6 on the same plate represents a pretty variety of this lively little butterfly, which is also in the cabinet of Mr. Jackson. It was captured by him in August last at Walthamstow. The short white lines on the hind wings in the plate indicate all that is left of the coppery band; they are seated on the wing-rays. The missing parts of the band are replaced by the blackish ground colour.

Vanessa io.—Whilst staying in the New Forest last September I took a specimen of this butterfly having on each fore wing a pale and somewhat indistinct spot between the sub-median and third median wing-rays; that is, in a position corresponding exactly with the squarish black blotch on the fore wings of *V. urticae*. I find that only one other specimen in my series possesses this spot, and this one is also from the New Forest. I presume this is not an unusual marking, though I do not remember having seen any previous mention of it. Mr. Bacot first drew my attention to this mark, and he has at least one similar specimen in his collection.

V. urticae.—My efforts to breed a decent variety of this insect have always proved unavailing until last year, when my perseverance had its reward. On that occasion my collection of the larvæ consisted partly of a brood of about one hundred from some nettles on the bank of the River Lea, at Clapton, and partly of about one hundred collected at random from several broods on a patch of nettles at Leigh, Essex. With very few exceptions, all these larvæ were about the same size, and all pupated about the same time. The first hundred or so which emerged were the miscellaneous ones from Leigh, and these were mostly typical. The only exceptions of any note were as follows:—Two

had the ground colour of a very much richer red than usual, and the yellow blotch at the anal angle of the fore wings almost entirely replaced by the red colour with a few black scales; two had a distinct yellow median band crossing fore wings (see Plate, fig. 3); and two had a blackish cloud at the apices of the hind wings, nearly obliterating the yellow blotch usually present there. Before these had all emerged, the single brood from Clapton had begun to come out. These, however, were not at all typical, and the whole brood was somewhat phenomenal from the fact that no specimen had the twin black spots on the fore wings *clearly* present. In every case each spot was represented by only about ten to forty black scales, instead of about four hundred or more, as is the case in an average typical specimen. Two of the specimens had these two spots wanting (fig. 2). These closely approach var. *ichnusa*, but do not strictly agree with it, as that variety is characterised, I believe, by the *complete* absence of the twin spots, and also of the yellow blotch at the anal angle of the fore wings; in my specimens the blotch is present, though very much reduced in size and density, and the spots, under the microscope, are seen to be represented by two or three black, and a few very dark red, scales in each case. The other markings on all the individuals of this remarkable brood were normal, though the general ground colour seemed very slightly paler than is usual in the species, and several of the specimens had the hind margins of all the wings of a pale buff-grey.

V. cardui.—On Whit Monday last year I went with Mr. W. H. Jackson to Chattenden, Kent. On the way from the station to the wood we noticed several worn specimens of this insect flying in a field in which the field thistle abounded, the plants being about a foot high. On these, *cardui* was busily engaged in the work of oviposition. We found the eggs rather scattered and laid indiscriminately on almost any part of the plant, though mostly on the leaves. Whilst we were collecting some, we suddenly came across a little colony of about fifty of the butterflies at rest on, or hovering over, a patch of thistles about three yards square. On examining these plants we found them literally covered with eggs. There were probably at least three hundred on each plant. We contented ourselves with one leaf each; that is, with about sixty eggs apiece. On proceeding a few yards further on we came to another and similar colony of butterflies and eggs. These patches of thistles were not in any way isolated from the rest, nor did they appear at all different from the others in the field. It would be interesting to know if any other collector has observed such a remarkable occurrence in connection with this butterfly. The ova which I took completed all their metamorphoses in six weeks from the day they were taken, and all produced normal specimens with the exception of two. One of these had an additional white spot in the brown part of the fore wings, and just below the usual group of white spots at the apex (fig. 5). This spot is surrounded by a black ring, and its position exactly coincides with that of the white spot frequently found in the red band on *V. atalanta*. This interesting point seems to me an undoubted argument in favour of a common ancestor for *cardui** and *atalanta*, par—

* With regard to this we would refer our readers to an excellent paper by Dr. Dixey, "On the Significance of certain wing markings in the *Nymphalidae*," published in the *Trans. Ent. Soc. Lond.*, 1890.

ticularly as this form of variation is of such frequent occurrence in both species, though I suppose *atalanta* is the more favoured in this respect. The other abnormal specimen (fig. 4) has the left wing malformed and dwarfed, though not in the least crumpled or devoid of pigment. The malformation consists in a curious disturbance of the wing-rays, three of which abruptly cease before reaching the margin of the wing; one of the median rays is branched, and one of the branches is again branched. Several of the other rays, also, are not quite normal. The explanatory sketch (fig. 4a) will, I trust, make this description clearer. The markings, as might naturally be expected, are curiously modified, many of them coalescing in such a manner as to suggest that it is only the wing-rays which prevent them from doing so always. The other wings of the specimen are normal. I thought this curious malformation might be of some assistance to those who make the neuration of insects' wings a special study, and this must be my excuse for taking up so much space in describing it.—202, Evering Road, London, N.E.

DESCRIPTION OF PLATE D.

Fig. 1.—*Papilio machaon*, L., bred by Mr. W. H. Jackson.

„ 2.—*Vanessa urticae*, L., nearly identical with var. *ichnusa*, Bon. Bred; larva from Clapton.

Fig. 3.—*Vanessa urticae* (ab.), bred; larva from Leigh.

„ 4.— „ *cardui*, L., malformation. Bred.

„ 4a.— „ „ explanatory sketch.

„ 5.— „ „ (ab.). Bred.

„ 6.—*Polyommatus phlæas*, L. (ab.). Caught by Mr. Jackson at Walthamstow.

STRAY NOTES ON CERTAIN SPECIES OF BUTTERFLIES.

By J. W. TUTT, F.E.S.

The pupæ of the Satyridæ.—Perhaps no group of our butterflies has been arranged more solely on the imago condition than our *Satyridæ*, and then on purely superficial characters. Thus we often find *semele* united in the same genus with *janira* and *hyperanthus*, and so on. Thanks to Messrs. Bowles, Wolfe and W. F. de V. Kane, I have obtained a fair share of the larvæ of our *Satyridæ* this spring, and am now breeding them, and I offer the following remarks in the hope of getting some happily-situated individual to complete my observations, or otherwise, as an incentive to someone to send me more material to complete them myself. The larvæ show that the *Satyrids* are a well-defined group, but the pupæ give indication of necessary subdivision. *Types of Satyrid pupæ.*—The pupæ of *Satyrids* take two extreme forms, the *Nymphalid* and the *Hesperid*, of which *Lasiommata ægeria* offers the best example of the former, and *Satyrus semele* of the latter. The former is of that type which is suspended by the cremastral hooks (at terminal segment); has a depressed metathorax and first abdominal segment; lateral protuberances to head; swollen 3rd and 4th abdominal segments; a distinct medio-dorsal ridge down the thoracic segments, most prominent on the mesothoracic segment; distinct lateral movement in abdominal segments; the antennæ reaching to the apex of the wing;

and finally, has subdorsal rows of rounded tubercles or angular points on some or all of the thoracic and abdominal segments. The latter (*Hesperid*) type does not suspend itself; has a protuberant head; no lateral head prominences; no wing ornamentation; wing cuticle almost transparent; no medio-dorsal ridge; no subdorsal tubercles; the 1st spiracle (thoracic) with a prominent black hood on hinder margin; the antennæ not reaching to the apex of the wing; and, most important of all, has no lateral movement whatever of the abdominal segments. So much are *galatea* and *semele* like *Hesperids*, that I should have been easily misled into referring some American *Hesperid* pupæ (*Thymeletityrus*) sent me by Dr. Chapman, to the *Satyrid* group of which *semele* is the type. In those I have examined, I find the following groups:—

- | | | |
|---------------|---|------------------------------------|
| A. Nymphalid. | { | 1. { <i>Lasiommata ægeria</i> . |
| | | 2. <i>L. megæra</i> . |
| | | 3. <i>Epinephele janira</i> . |
| | | 4. <i>Hipparchia hyperanthus</i> . |
| B. Hesperid. | { | 5. <i>Melanargia galatea</i> . |
| | | 6. <i>Satyrus semele</i> . |

(4). I do not yet know any character on which *semele* and *galatea* can be separated generically, but as they always have been so separated, I should suggest the continuance of their separation, pending further observations. (3). *Hyperanthus* certainly has no close connection with *semele* and *galatea*, it is lacking affinities with these in every essential, except that it has no conspicuous lateral head prominences. The ground colour, too, recalls *galatea*, but this is entirely superficial. Just as *janira* has less developed lateral head prominences than *ægeria*, so *hyperanthus* has them less developed than *janira*, in fact, they are so far abbreviated, that they are only separated from the rest of the face by a line. The peculiar flatness of the face of this pupa, by which the ordinary ventral part of the head is brought into line with the anterior part, and with the prothorax, appears to me rather striking. The lateral movement of the pupa, puts this with the Nymphalid section. (2). *Janira* comes close to *ægeria*. It suspends itself by the cremaster; has rather less developed lateral head prominences; is much more slender; the wings depressed; the ornamentation of the wings of a decidedly different type (almost identical with the form in *hyperanthus*). (1). *Ægeria* and *megæra* present the most perfectly Nymphalid form of the group, and in this particular, are more Nymphalid than *Melitæa*. Their larvæ, however, are distinctly of the *Satyrid* type.

How *semele* and *janira* have ever been put into the same genus is a complete puzzle. In fact, it is difficult to explain why *semele* has ever been located elsewhere than with *galatea*. A still more wide-reaching fact becomes evident, from the study of the early stages of these butterflies, viz., the connection, through the group of which *galatea* and *semele* are the types, between the *Satyrids* and *Hesperids*. This group has purely *Satyrid* larvæ, and evident *Hesperid* pupæ. It will necessitate a modification in that form of classification, chiefly as yet confined to American authors, where the *Satyridæ* are placed at the top, and the *Hesperidæ* at the bottom of what is supposed to be a natural sequence in the order of butterflies. If such a natural sequence be possible, it is clear that the *Satyrids* fall naturally between the *Nymphalidæ* and *Hesperidæ*.

On the pupal wing in Butterflies.—In the *Trans. Linn. Soc.*, Ser. 2, Zool., vol. v., pp. 255-257, is a paper by Prof. Poulton on "The form of the imaginal fore wing detected on that of the pupa," in which he deduces certain conclusions based on the assumption that "although the wing of the imago expands into a size far beyond that reached by the pupal organ within which it is developed, the former does not entirely fill the latter before emergence," and that "the margin of the imaginal wing lies well within the corresponding margin of the pupal wing." As I have been paying considerable careful attention to points of structure in our butterflies this year, I found some peculiarities in the structure of the wings of certain species, which could hardly be explained by Prof. Poulton's theory. These pupæ and suggestions I submitted to Dr. Chapman, and he informed me that he had already come to the conclusion that Prof. Poulton was wrong, and made several suggestions relative to the matter. As there is no time like the present, and I had a considerable amount of material coming to hand, I commenced to work on Dr. Chapman's suggestions, and set myself to test Mr. Poulton's assumptions, with a view of considering whether the conclusions could be justified. I found, as Prof. Poulton remarked, that "the two margins (pupal, and so-called imaginal) are often separated by an interval, but their contours are frequently very different," and I made out as I thought, that "in many species the position of the future margin of the imaginal wing can be distinctly made out on the pupal surface from the very beginning of the pupal period, and, long before the imaginal organs have begun to appear." The line which appears to correspond to the future imaginal hind margin is "especially distinct, and is separated from the hind margin of the pupal wing, by a very wide interval." Having made, on a large number of pupæ, the superficial observations necessary to test the assumed facts mentioned above, and on which Prof. Poulton's paper is based, I found that a number of species such as the pupa of *Lasiommata ægeria*, three species of *Argynnis*, and the whole of the *Vanessas* (except *antiopa*), had within the margin of the pupal wing, a more or less distinct line, bearing a more or less resemblance to the contour of the imaginal wing, and which I had no difficulty in determining to be the supposed outer margin of the imaginal wing. I was not altogether satisfied, however, that this line had anything like the positive relationship to the actual imaginal wing which he gave it, nor did I get anything like so positive an idea that this was the limit of "that part of the pupal fore wing, beneath which, the imaginal wing will develop," although "the lines which correspond to the future venation" were certainly "more or less visible in this area." Dissection showed clearly, that some structure was in this area between the two assumed margins, and as the hind wing projected but very little in most instances beyond the pupal fore wing, I felt that the structure had something to do with the imaginal fore wing. I was further stimulated by supposing that this portion of the wing might represent the thickness of the imaginal wing, and so I kept close observation on the pupæ, during the time that the imaginal wing was in process of formation. The first species to which I gave this special attention was *Lasiommata ægeria*. The imaginal wings three days before emergence were of a pale whitish-brown colour, extending beyond the so-called imaginal hind margin to the pupal hind margin. Next day, the brown colour showed that this observation was correct, whilst on the morning of emergence,

the dark scales were seen throughout the area of the pupal wing, the portion of the imaginal wing actually developed beyond the supposed imaginal line on the pupa, being the dark band on the outer margin, *i.e.*, beyond the ocellus, the pale creamy lunules on the extreme margin, showing through the transparent pupal wing most distinctly. I then examined *Vanessa urticae*, and I noticed that the red part of the real imaginal wing reached to the supposed imaginal, outer marginal line on the pupa, the dark outer margin of the imago, containing the blue lunules, being developed between the imaginal line on pupa, and the margin of the pupa itself. But my most satisfactory observation was on *Grapta c-album*. The dark colour of the pupa, made observation at first rather difficult, but as the scales got more and more highly coloured, it became clear again, that just as in *V. urticae*, the line on the pupa supposed to correspond with the outer margin of the wing, only bounded the red portion of the wing, the dark outer margin being beyond. As there is a distinct ridge leading from the line supposed to be the boundary of the imaginal wing and the margin of the pupal wing, it became clear that this portion of the wing was bent downwards. Whilst making these observations the imago emerged, and, sure enough, the outer margins of the wings were bent downwards. I was much surprised to note, too, that at the moment of exclusion, and for a short time after, the shape of the margin of the wing corresponded with the margin of the pupal wing. Further, that the outer margin of the wing was almost entire, although puckered and folded at the points which afterwards develop into tips or angles, and that the angular projections are the last part of the wings actually developed; the downward direction of the margins is retained, until the wings are thoroughly and completely expanded. Such a result as I here record, was almost foreshadowed in Prof. Poulton's own paper. Speaking of the pupal venation, he says:—"These lines cease at the limits of the area over which the wing will be formed (*i.e.*, what he assumes to be the line on the pupa representing the outer margin of the imago). Sometimes, however, their direction is continued by irregular lines of pigment across the interval, between the pupal and future imaginal hind margins. These irregular continuations are, however, very different in character from the more defined appearance of the lines which represent the venation. When the latter are studied, in especially favourable species (*e.g.*, in *atalanta*) they are seen to correspond exactly with the future of the imaginal wing." This is so. They do so correspond as far as they go, but the bending down of the outer margin of the wing, seems to offer a satisfactory explanation as to their want of continuance to the outer margin. In the upper part, the imaginal wing is regularly impressed, as it were, on the pupal structure above, and gives it its character; in the extreme outer margin the folding of the membrane prevents the same general application, but where it does occur, they are found to be traceable, as shown by Prof. Poulton, to the outer margin of the pupa. Prof. Poulton makes another remark, and gives drawings to show his meaning that, in "*Grapta c-album*," which possesses a far more jagged hind margin than any other British butterfly, the hind margin of the imago is far more jagged than that of the corresponding line upon the pupa." Just so, this exact statement states the matter, but is to be explained at once by the fact that "the corresponding line on the pupa," as Mr. Poulton calls it, does not represent the hind margin at all, but really represents the boundary of

the red colouring matter in *c-album*, and if any lepidopterist will compare the line bordering the outer edge of the red colouring matter in *c-album*, he will see that the hind margin of the imago is far more jagged than that of the margin of the red colouring matter on the fore wing.*

These observations open up a new and delightful field of study, and I dare say, some of the above suggestions may have to be considerably modified, when further attention has been directed to them. I ought hardly to conclude these remarks without thanking Dr. Chapman for allowing me to worry him on the subject, and Messrs. Bowles, Wolfe and Nesbitt for material to enable me to look into the matter.

The antennæ of Gonopteryx rhamni.—Thanks to Mr. Bowles, who sent me larvæ of this species, I was enabled to make some observations on the development of its imaginal antenna, and the following may be interesting. As I daresay is well-known, the antenna of this species is comparatively short, the apex curved downwards, and altogether unlike that of a typical Pierid. I was, therefore, rather surprised to find the pupal antenna somewhat close to that of typical *Pieridæ*, and determined to try to get some clue to the development of the imaginal antenna, before exclusion. When I first noticed the imaginal antenna forming inside that of the pupa, the imaginal antenna was already decidedly shorter than the pupal, the tip of the latter (corresponding in part with the knob of *Pieris* antenna), being empty, but the tip of the imaginal antenna was not yet turned down; bearing thus considerable resemblance to a *Colias* antenna. Next day, the tip of the imaginal antenna was still further from the tip of the pupal, the former being bent down, and assuming the typical imaginal form. The following day (some three or four hours before emergence), the form of the typical imaginal antenna was very distinct, and was then conspicuously shorter (about $\frac{1}{10}$ to $\frac{1}{12}$ of length of pupal antenna) than the pupal structure. My observations lead me to suppose that the imaginal antenna only occupies the whole of the pupal antenna in the very early stages of its development; certainly by the time it becomes visible from the outside, it is much shorter than the pupal structure, and almost as short as at the time of exclusion.

THE PUPAL AND IMAGINAL WINGS OF LEPIDOPTERA.

By Dr. T. A. CHAPMAN.

Mr. Tutt has very kindly sent me a proof of his remarks and record of the observations he has made on this subject. As I have not yet come to any final conclusion on the subject, I ought, perhaps, to have kept

* Since writing the above, observations on *V. io* at the point of emergence show that in this species the imaginal wing is apparently almost exactly identical in its limits with "Poulton's line," a series of pale lunules appearing at the edge. Arresting, however, the development just previous to emergence, I find these lunules agree with the row of indistinct lunules (seen clearly on the underside during the expansion) before the outer margin, and that the extreme outer margin is bent down and folded exactly as in *c-album*. The same falling over of the outer margin also is seen on emergence, and there is scarcely any trace of angles to the wings at the moment of exclusion the margins (of the fore wings especially) being almost entire. The agreement of the enclosed imaginal wing with "Poulton's line" is, therefore, apparent only, not real.—J. W. T.

silence, but a remark or two may perhaps be useful. I think that we are to be congratulated, that so energetic and enthusiastic an observer as Mr. Tutt, has taken up pupæ, and may hope that he will lead the way for an army of our younger entomologists, who will find them fully as interesting as the imagines.

The inner line round the margin of the pupal wing, which Professor Poulton regards as the outline of the imaginal wing, I will call "Poulton's line" to save circumlocution. The conclusion I have provisionally arrived at, is, that "Poulton's line" is the margin of the membranous portion of the imaginal wing, that the further space represents the fringe. This may appear to be very like Prof. Poulton's conclusion, but it is essentially the reverse of it, since the pupal margin is *not* the record of a past imaginal wing; both margins having been always both pupal and imaginal as they are now, but in certain species the entire margin (margin of fringe), has submitted to variation in the pupal state, to suit the exigencies of the pupal form.

Mr. Tutt's observation on the antennæ of *Rhodocera* (*Gonopteryx*) is very interesting, and comes as an illustration of the true meaning of his observations on the wing; the development of the wing begins with the membranous margin at "Poulton's line," but it has not proceeded very far, before it has slipped away from it; in some species, towards the base (e.g. *Varasa chloris*); as it happens, in those species, Mr. Tutt has examined in the other direction, crowding the hind margin of the wing down to the extreme of the available space. This bears on Professor Poulton's explanation; not as showing that the wings develop where Mr. Tutt finds them, after development has proceeded for some time, but as showing that in these species (*c-album*, &c.), which Professor Poulton selected as illustrating the declining size of the imaginal wing; the imaginal wing as pupal structure is really too large for its pupal space and not too small.

As the observations that have led me to these conclusions require to be extended and amplified, I refrain from reporting them at present.

MELANOCHEISM IN BRITISH LEPIDOPTERA.

By A. R. GROTE, M.A.

I have read with much interest Mr. Tutt's remarks upon my little paper on "Melanochroism in British Lepidoptera." In several and important points they supplied me with fresh information, especially as to the fact that "there is no shadow of a doubt that there is a much larger *total* number of dark forms produced in wet and smoky places." This fact I had questioned, saying that it did not seem to be proven. But my paper must be considered as mainly suggestive and probably only useful that, by its correction, fresh light may be thrown upon its subject which is one of general interest. The question is, as Mr. Tutt happily puts it, what are the forces in existence at the present time which develop the latent tendency (which exists by inheritance) to melanism? It had seemed to me, I will say at least possible, that the phenomenon of melanism was due wholly to reversion and the law of inheritance, and that its display in certain localities, say damp and smoky places, was not directly owing to the physical effect of damp and smoke upon the insects. I do not as yet understand the way in

which damp can affect the larvæ so as to produce melanic moths. But if, as Mr. Tutt says, by artificially selecting black parents the direct result is that in their progeny the number of black individuals is enormously increased, then it is clear that such selection, either natural or artificial, may be one of the forces leading to the display of the latent tendency to melanism existing in certain species as a character of reversion. As a matter of fact, I was ignorant that this was experimentally proven. We have now, then, the two facts to go upon, that damp and smoky places produce a greater *total* amount of melanic individuals, and that by breeding from melanic parents, the number of black specimens in the progeny much exceeds the number found in broods of the type form. The question still remains as to why wet and smoke produce melanism. The answer is suggested by Mr. Tutt that damp and smoke (or darkness) artificially produce to-day a resemblance in conditions to the environment of the species in geological epochs when its typical form was black. Now remains the query as to whether any of our exceptional localities of to-day are sufficiently damp and dark as to be properly compared with general conditions in any former geological epoch in which dampness and darkness were the general rule, affecting geological life generally? As to *how* wet produces melanism I do not understand the question to be at all answered. But in what way does a renewal of a physical environment, which was once normal to the species, act upon its now normal colouring so as to produce reversion to a former colouring? The experiments with Indian butterflies go to show, that there may be a connection between dry or wet conditions and dimorphism, and I think, do not entirely cover the present question. They seem to run parallel with Edwards' experiments with American dimorphic or polymorphic butterflies, and show that, by an imitation of seasonal conditions, alteration of temperature and humidity, a tendency to meet these conditions is shown in the colours and pattern of the insects. Is dimorphism parallel with melanism, are both phenomena of reversion? Is the wet dimorphic form the older, reversional form of the species? Does the wet tropical season answer to the normal physical conditions in a former geological epoch? To my suggestion that dark resting places are protective to dark forms, Mr. Tutt says, that "the direct result of the protective nature of these resting places is, to favour the most protected specimens and eliminate the least protected specimens, which I take it is "natural selection," and which, therefore, renders abortive Mr. Grote's previous suggestion 'that the *modus operandi* of natural selection has only been inferentially explained or proven' (i.e., in the present case)." Now, in my argument as to the protection afforded by dark resting places, I distinguished between an apparent artificial survival through protective causes and a real survival of the fittest, under the law of "natural selection." If dark resting places however really produce a larger total number of dark specimens, then, in such places, instances where both parents are dark, would be naturally more numerous, and if (as Mr. Tutt says is proven) the production of melanic progeny is directly influenced by the colour of the parents, then, the presence of melanic breeds in certain localities would be sufficiently accounted for. Still, in all this, we have to deal with a character of transmission or reversion, and the utmost we seem to have proved is, that melanism usually exhibited at the longer interval of reversion, is to some extent exhibited also at the shorter

interval, between parent and progeny; it is a matter not only of reversion, but may be one of immediate inheritance, though not invariably. Beyond this, it seems that the wet and dark places, favouring the production of dark specimens, may be further held to act as agents in the operation of the law of "natural selection." But the matter is chiefly interesting in an experimental light, and there is a wide field before us to go over. I follow Mr. Tutt in his view, that in melanism, we have to do with a phenomenon of reversion, and the real or supposed causes which lead to its more abundant and temporary display. My idea, which Mr. Tutt now corrects, was that it only *seemed* to be abundant in certain localities, and I offered a reason for this *seeming*. But if the physical conditions of the localities directly act in the direction of melanism to-day, we may have also to do with an acquired character, equally susceptible of transmission. Thus melanism, so far as the facts go, may be either freshly acquired, or appear by reversion. And just here comes in the question, whether dark and wet localities produce melanic individuals belonging to species which, in other places, never produce distinctly black examples. Or are we justified in holding that wet and dark places only act upon species having a latent tendency to melanism? To work out all the factors in the case, is a matter for our patience and ingenuity, and I shall be very glad if anything in my very modest and wholly tentative remarks proves of interest to students of the subject, among whom, Mr. Tutt, who has already done so much, occupies deservedly so prominent a position. At any rate, in their correction, the better view will have become more plain.—Bremen, Germany.

Mr. Grote is quite right in saying that the experiments on the Indian butterflies "do not entirely" cover the question of melanism, but they do give us one very strong scientific fact, and that is, that moisture can so unsettle as it were the normal constitution of the larva that its natural hereditary tendency to produce a certain form is overcome and another form is produced in its place. It further shows us that moisture can act on the constitution of a larva as to produce or intensify certain general forms of variation. This being so, I think it a fair assumption that the excessive moisture of parts of the British Isles should produce a certain amount of variation in certain species, and when we find, as we do, that such localities do produce a great amount of general variation in certain species, and when further we cannot point to any other active factor which can probably produce such variation in these districts, I think it a fair assumption (knowing the capabilities of moisture) to suppose that the variation is thus originated in such localities. The summary of Mr. Edwards' experiments in dimorphic and polymorphic butterflies, as given by Mr. Grote, is sufficient to prove my point, *viz.*, that external influences, of which humidity is one, are sufficient to produce variation, or as Mr. Grote puts it, produce "a tendency to meet these conditions," as "shown in the colours and pattern of the insects." So far, I take it, "melanism" is parallel with "dimorphism," in fact, with any other form of variation, inasmuch as both (or all) may require an active agent to produce the initial variation which has to be moulded into its various forms. Having obtained this initial variation, "natural selection" steps in and selects those varieties which are most suitable by environment and by constitution to that *special locality*, and a permanent (so long as the local conditions are *unaltered*) race is formed.

There is considerable material for reflection in Mr. Grote's note to which off-hand suggestions would not be wise, but, to his paragraph relating to "whether dark and wet localities produce melanitic individuals belonging to species which in other places never produce black examples," or whether "we are justified in holding that wet and dark places only act upon species having a latent tendency to melanism," I would offer a few suggestions, although I have previously dealt more or less directly with the facts involved. That only an approximate attempt can be made to answer these questions is evident, for how are we to determine what species have a latent tendency to melanism until some unusual factor draws such latent tendency out and makes it visible to us? As an example of what I mean, our *Gnophos obscurata* on the Sussex chalk hills, are white or whitish-grey, and a series of some dozens from this locality would never give us a hint that there was in the species a latent tendency to melanism, and the race in this locality is a very constant one. At Folkestone, although a very large percentage are of the pale type, banded forms are not infrequent, and dark grey specimens are by no means rare. Here the inherent tendency is made manifest by general variation. In the New Forest and in the neighbourhood of Perth, no pale specimens are to be obtained; all are black. The action of "natural selection" in the localities frequented by the species in the latter places, is self-evident, and is evidently dependent on the habits of the insect, and the dark (natural) coloration of the geological strata on which they are found. In a similar way, the buff specimens of *Tephrosia crepuscularia*, which abound in our Kent woods, give us no clue as to the inherent tendency to melanism as exhibited in the species in South Wales, nor do the pale specimens of *T. biundularia*, in our south-east counties suggest the melanitic tendency in the species which is developed in Derby, Mansfield, Yorkshire, Staffordshire, &c. But although a straightforward answer is in this way almost impossible, I take it that such places would act upon species (which we are not aware have a melanitic tendency) and produce general variation, and that when such general variation had been once set up, then, if melanism were an advantageous form, "natural selection" would preserve it in direct proportion to its advantage to the species. It is too complex a subject, however, to be handled in a short explanatory note of this kind, but there can be no doubt that items of this kind must be worked out by us, or by those who follow us.—J. W. TUTT. *June*, 1893.

VARIATION.

VARIATION OF THE LARVÆ OF SATURNIA CARPINI.—In June, 1892, I took a brood of young larvæ of this species on a whitethorn hedge near Thundersley, in Essex. From a ♂ and ♀, reared from these larvæ, I got a batch of ova this spring; these hatched in about twenty days. After their first moult, the larvæ varied very widely, some of them being entirely green or pale yellow, without any black, some remaining (until their third moult) quite black, with the exception of a reddish or brownish stripe along the side. The latter retained a large proportion of black in their coloration until nearly full-fed, while others, exhibiting nearly every grade between these two extremes, could be picked out of

the brood. It seems strange that a brood of larvæ should vary so widely after their first moult, and yet be so alike (comparatively speaking) in their last stage.

The following has occurred to me as a possible explanation:—The larvæ, until the first moult, are quite black, and they feed gregariously until the third moult. When feeding on a hedge or bush they might easily be overlooked, as the effect of a brood of small black larvæ lying close together is to blot out the leaf or leaves they are feeding on, leaving an apparent opening in the hedge, such as would be obtained if one or two leaves were picked off. If, however, the whole brood retained their black colour as they grew larger, the size of the apparent opening or hole in the hedge would become noticeable, but as they vary in colour, they match very well with the bright green leaves and dark spaces between, in fact, if they cleared a patch of leaves, the larvæ would themselves (to a certain extent) present the appearance of the missing foliage. No doubt, after the third moult, when they scatter, the bright forms are, as regards colour, by far the best protected.—A. BACOT, Bow House, St. James's Terrace, Clapton, N.E. *June 26th*, 1894.

FADING OF *GEOMETRA VERNARIA* AND *IODIS LACTEARIA*.—While collecting in a garden here one night, I captured five specimens of *Geometra vernaria*. Three are very perfect, and the green colour very bright. One has the upper wings delicate cream colour tinged with salmon, the white lines quite distinct; the under wings bright green, broadly edged with cream colour; the fifth has scarcely any green colour showing at all, but is too much worn to distinguish. This variation can hardly be owing to the moisture of the atmosphere, as the weather has been so dry lately. I have some ova, and hope to breed them. Is the blue form of *Iodis lactearia* usual? At Lyes, in Hampshire where I have collected for some years, I get plenty of the blue variety, the blue being very clear and bright, and also the white, but no green.—(Miss) A. J. MARINDIN, The Art College, S. Wimbledon. *July 2nd*.

[*Geometra vernaria* is always of a beautiful green tint when bred. The pale creamy and whitish ones are the result of exposure (not necessarily damp), and generally in the course of fading get a pink tinge. *Iodis lactearia*, we believe, is always bluish-green when freshly emerged from the pupa. A few hours simple exposure to light takes the colour out. In fact, the brightest tinted examples become white in the best made cabinets in a very short time.—ED.]

COLIAS EDUSA VAR. *HELICE*.—I saw this species near Caterham on 22nd May (Whit Monday) at rest on thyme about three p.m. I also met with a single specimen of the normal form of *C. edusa* a few days previously, and on the same day as I saw var. *helice*, I came across another normal specimen of *edusa*. I was unable to distinguish the sexes.—ARTHUR LOVELL KEAYS, Upwood Tower, Caterham Valley.

SMALL RACE OF *ZYGÆNA FILIPENDULÆ*.—I lately met with a race of very small *Zygæna filipendulæ* with very small red blotches on the front wings, generally coalescing as follows: The 2 basal and either the middle or terminal ones. I have seen this abroad, but never such diminutive specimens.—W. F. DE V. KANE, Monaghan. *May 25th*, 1893.

CURRENT NOTES.

DR. KNAGGS has finished his "decoy" article in *The Entomologist* in the most approved "bird catching" fashion. He has further put it to practical test by catching a specimen of *Pieris rapæ*.

MR. W. F. de V. KANE, in his "Catalogue of the Lepidoptera of Ireland," questions the general occurrence of *Ctenonympha typhon* var. *laidion* in Ireland. This may be correct, but a comparatively long series in our collection from Sligo, are entirely of a very pale colour, with poorly ocellated spots. Mr. Kane mentions having only met with single specimens at Sligo. This would point to a localisation of special forms in Ireland, as complete as is the case in Great Britain.

LORD RENDLESHAM reports six more *Sphinx pinastri* from the same locality as last year, and *Plusia moneta* is recorded from Dorking and Tunbridge Wells. It is to be trusted that collectors this year will not help those who purchase large numbers of European pupæ of these species, to exchange their specimens as British. Last season quite a number (some dozens) of *S. pinastri* and *Deilephila euphorbiæ* were sent out in exchange as British, the former, reputed captures in the New Forest and Suffolk, the latter in Devon. Our collectors must know that only Lord Rendlesham, and at most three or four other collectors (all of a class who never exchange insects) are the only persons who take *S. pinastri*, and that *D. euphorbiæ*, with the exception of an occasional immigrant, has not been British for some three-quarters of a century.

It is with the greatest regret that we have to announce the death of Herr Fritz Rühl, the President of the International Entomological Society, Editor of *Societas Entomologica*, probably almost as well known in Britain as on the Continent.

A most interesting paper on *Dasychira pudibunda* ab. *concolor*, Stdgr. is published in the current No. of *Societas Entomologica*, p. 50.

We are indebted to Mr. Cockerell for a most interesting account of the "army worm" ravages in the United States, from the *St. Louis Daily Globe Democrat*, of June 11th, 1893. This contains a summary of the previous injurious visitations of *Leucania unipuncta* in the United States, together with many local reports from Illinois of the damage being done this year to corn crops. Special attention is directed to the fact that the "army worm" that injures the corn is *Leucania unipuncta*, whilst the "army worm" that injures the cotton is *Heliothis armigera*.

It is really surprising that with seventeen names on the cover of the *British Naturalist*, there appears to be no one competent to edit the material appearing therein under the name of "Entomological Nomenclature." We recently called attention to the ridiculous errors into which Mr. Dale had fallen in attempting to set Kirby and Staudinger right, and to his abuse of the Latin of the older authors. His remarks on the name *bellargus*, are marvellous. In these, Mr. Dale poses as an opponent of "nonsense" names. Mr. Dale says, "Argus was the hundred-eyed guardian of Juno. 'Belle' is a French word signifying 'beauty,' as La Belle Isle," thus wishing us, I suppose, to assume that *bellargus* is partly French and partly Latin, in other words, that *bellargus* is a corruption of "belle argus." What nonsense Mr. Dale

surely wishes to let us know how little French and Latin he has learned, but if he will turn up a Latin dictionary, he will find that the French "belle" is a modification of the Latin adjective "bellus, a, um," and that *bellargus* is nothing like the nonsense-name he would have us believe. There are, at any rate, two Assistant-Editors with University degrees on the staff of the *British Naturalist*, and we might hope that matter of this kind would be submitted to them before publication. Dr. Buckell's strictures on Mr. Dale's work are hardly severe enough, but it is amusing to read Dr. Buckell's criticism on pp. 139-142, and then plunge at once into another series of remarks (pp. 142-146) of the same lofty character, scientific inaccuracy, and classical impurity as the previous effusions on the same subject. "Alis superiris rufis," "nigrescantibus deorsum," misquotes Mr. Dale, and then he cavils at the construction of "bellargus." Whatever, too, is the "Poas figure of *icarus*" referred to by Mr. Dale?

The *British Naturalist* has at last a photograph of a "Naturalist of the day," an excellent one of our esteemed friend, the President of the South London Entomological Society, Mr. J. Jenner Weir.

Mr. Newstead, in the current number of the *Ent. Mo. Mag.*, describes a new genus (*Pseudinglisia*) of Coccids, and a new species (with plate) which he names *rodriguezia*. It was found on *Rodriguezia secunda* at Eaton Hall, Chester. Mr. Newstead is in doubt about its position "bearing as it does characters of the *Lecaninae* and the *Coccinae*; of the former, the anal plates, and of the latter, the multiaxillate rostrum and anal lobes."

Mr. C. G. Barrett records the capture of *Bryotropha figulella*, Staud., on waste ground or salt marshes near Aldeburgh in July, 1892. It is distinguished by Mr. Barrett as being "smaller than *terrella*, with proportionately broader fore-wings, the costa of which is decidedly arched before the middle." It is to be hoped that this last addition rests on a more solid foundation than have most recent additions to the *Gelechiidae*.

A gynandromorphous *Smerinthus populi* is recorded in the *E. M. M.* as being bred in May last by Mr. S. C. Brown. The antenna and wings on the left side are ♂, those on the right side are ♀. *Sesia sphegiformis* is also recorded from Basingstoke, the empty pupa cases sticking out of the alder stems about three or four inches from the ground.

Hesperia actæon was taken this year during the last week in May. In the fearfully cold and wet summer of 1888 some did not appear till September. In ordinary seasons it occurs in July and August. Mr. Dale refers (*E. M. M.*, p. 164) to the species having a second brood quite as a matter of fact. In his *British Butterflies*, p. 218, he says, "there are apparently two broods of the butterfly, the first appearing in June, the second in August," &c. Has anything been done to change the "apparent" two broods to a certainty? A further remark made by the same author is, that "the eggs are laid in June, July, and August. The caterpillars hatched from the earlier-laid eggs, feed up before the winter comes on, and hibernate probably in the chrysalis state. Those from the later eggs hibernate small, and feed up in the spring. Being full-fed in the middle or end of June; they remain about a fortnight in the chrysalis state" (*l. c.*, p. 218). Now all these paradoxical statements may appear very clear to Mr. Dale. 1st, the butterfly appears in June and August. 2nd, the eggs laid by the June butterflies feed up before winter and hibernate in the chrysalis state.

3rd, the eggs laid in August hybernate as larvæ. 4th, the larvæ full-fed at the end of June produce imagines in July. By being "double-brooded," and appearing in June and August, we should expect the June-laid eggs to produce butterflies in August, but Mr. Dale tells us the June-laid eggs hybernate as pupæ. Secondly, that although the two broods of the butterfly occur in June and August, the larvæ, full-fed at end of June, produce butterflies a fortnight later, thus interpolating another brood (?) between June and August. These statements point very conclusively to a very inexact knowledge of its life history, and on the face of the suggestion that the insect hibernates both in the larval and pupal condition, Mr. Dale must excuse us for scepticism as to his knowledge of the life history of the species.

PRACTICAL HINTS.

THE MONTH.—Larvæ, although plentiful, are usually left in the back ground this month, and all the energies of the enthusiastic lepidopterist devoted to the collecting of "imagines," both day and night producing new and interesting specimens. Tree trunks, palings, fences, and walls should not be forgotten; on lichen-covered walls, *Bryophila perla* and *glandifera* may be there found in plenty. Tree trunks, fences, &c. produce many of the **GEOMETRÆ**.

The great prize among the butterflies is the purple emperor, *Apatura iris*, who, in favourite localities, may be seen soaring high over the oak; in years gone by, a net with a huge handle was employed to capture it, but now, his majesty is known to descend, and regale his voracious appetite on the (to him) luscious juices that exude from carrion and stinking puddles! where he can be easily netted.

Leucophasia sinapis are sometimes found this month (2nd brood), but never so numerous as the spring brood. In "clouded yellow" seasons, both *edusa* and *hyale* are found in clover fields; most plentiful in the south. *Vanessa polychloros* among elms, and on "sugared" and *Cossus*-infected trees.

: Light during this month is also very productive.—J. P. Mutch.

NOTES ON COLLECTING, Etc.

THE LATE COLIAS EDUSA YEAR IN GREAT BRITAIN.—The pleasures of an *edusa* year have again been realized by British entomologists. The numerous records of the occurrence and capture of the "clouded yellow" and its varieties in many parts of the British Islands last year, are exceedingly interesting to me. The discovery of the eggs, and the successful rearing of the beautiful insect through all stages of its existence in England, has also added greatly to our knowledge of the species. The irruption of *edusa* into the British Islands at intervals of years, is admitted by entomologists to be due to migration from the European Continent. There is an important feature of the occasional migration of *edusa* which has not, as yet, received full attention. I allude to the cause of the migrations. A more interesting subject could not be studied, yet it has not, so far as I know, been dealt with, scientifically, by any entomologist. As there was, unquestionably, an

immediate cause that compelled *edusa* to migrate westward in large numbers last season, I would be pleased if any entomologist having notes on the seasons of 1891-92 on the Continent, would publish them in the *Record*. Were the clover fields in any large area of Continental Europe more luxuriant in 1891 than in any of the several years preceding it, or was it generally a very favourable breeding year for all insects? judging by the number of rare migrants taken in England last year, I imagine that it may have been due to the latter cause, or to some seasonal derangement, or scarcity of food on the Continent in 1892. Perhaps, in the case of *edusa*, a failure of the clover fields.—W. W. SMITH, Ashburton, N. Z. *April*, 1893.

CANNIBALISM OF ARCTIA CAJA LARVÆ.—On page 157 of the *Ent. Rec.* there is a note concerning newly-formed pupæ eaten by the larvæ of *Arctia caja*. In 1889 I kept a brood of the larvæ of *Smerinthus populi* with the larvæ of *Arctia caja*, and noticed that the former gradually disappeared; but I could not find out the reason until one morning I saw one of the "Tigers" in the act of eating a "Hawk."—J. F. BIRD, Rosedale, 162, Dalling Road, Hammersmith, W. *June 18th*, 1893.

FAILURE OF SUGAR.—I have sugared in the most promising places, and on the best evenings for the last three weeks, and have only seen two common insects. I may mention that larvæ are also scarce. The locality is considered a good one, being on the borders of Tilgate Forest, and I have collected in it over twenty years, but never knew it so bad before.—C. HAMLIN, Forest Cottage, Balcombe Lane, Balcombe, Sussex. *June 27th*, 1893.

I have sugared four times, twice with Mr. Hewett near Winchester, and twice in the Isle of Wight. On the first occasion, nothing, on the second, 1 fine *Agrotis cinerea*; on the third, 1 *Thyatira batis*; and on the fourth, 5 *Aplecta nebulosa*, 1 *Grammesia trigrammica*, and 1 *Hadena thalassina* were all I saw, but larvæ are extremely plentiful.—J. C. MOBERLY. *May 23rd*, 1893.

The season has been very unsatisfactory. For the last month neither in the North nor here has anything come to sugar, and scarcely any insects seem to be on flight. After the heavy rain of the last two days, however, I saw plenty on sugar and at lime blossoms. In this locality, *Mania maura* seems very plentiful.—W. F. DE V. KANE. Ardtully, Kenmare, Kerry. *June 29th*, 1893.

THE LARVA OF LASIOMMATA MEGÆRA.—I have been rearing a few *Lasiommata megæra* from the egg. The larvæ were kept through the winter in a corked glass bottle, generally in a cold room. They never quite ceased feeding, even in the severe frost. The first change of skin after the winter was on February 13th, when the larva was about half an inch long. The earliest was in the pupa on March 31st, and emerged May 3rd.—J. E. R. ALLEN, Galway. *May 9th*, 1893.

NOTES OF THE SEASON.

North London.—My observances on collecting this season correspond exactly with previous notes—sugar useless, light attractive, and one of the earliest seasons on record. *Hypsipetes impluviata* I took in April this year. In 1891 I took them in the same place and in good condition on June 18th. I found full-fed larvæ of *Orgyia genotigna* by the 22nd of May.—A. W. MERA, Forest Gate. *May 5th*, 1893.

Galway.—The sallows were very early here, and were almost over before the full moon of April 1st. The nights were bright and cold, and the trees not very common, so insects averaged but few per night. I took some *Tæniocampa gothica*, and a few each of *Pachnobia rubricosa*, *T. stabilis* and *X. areola*. Larvæ of *Melitæa artemis* have been common in one or two places near here. On Saturday, the 6th May, I had an evening's mothing, and found many of the early summer Geometers out in force. *Venilia macularia*, *Cidaria russata*, *C. corylata*, *Thera variata*, &c. A crippled specimen of *Gnophria rubricollis* emerged from the pupa yesterday.—J. E. R. ALLEN, Galway. May 8th, 1893.

Ireland.—I have had some really good success this season at the sallows, for though they were very early, and went off soon, and had not any great numbers of moths most of the nights I was out, yet I took very rare species for Ireland in some numbers. *Tæniocampa opima* was almost as common as *T. stabilis*; of *Trachea piniperda* I took 17, and *Lobophora carpinata* was not infrequent. *Amphidasys strataria* not uncommon. *T. opima* varied from very pale silvery grey, with lightly marked central band almost indiscernible on ground colour. *T. piniperda* was large and very pale (birch colour). I also took a splendid *Tephrosia punctulata*, as white as *Cleora glabraria*, and, indeed, strongly resembling it superficially, with large black costal patches, and a friend named it so when he saw it off the board. It is scarcely to be recognised as the same species beside the ordinary dingy speckled specimens. Is this form well known? The *Tæniocampa gothica*, too, are very ruddy in Galway.—W. F. DE V. KANE, Drumreask House, Monaghan. May 25th, 1893.

New Forest and N. Devon.—What little collecting I have been able to do this season has been fairly successful. Sugar, both in the New Forest and Devonshire, seems very little good. *Apatura iris* larvæ have been more plentiful than usual in the Forest. I also obtained a good number of *Lithosia miniata*, and an abundance of *Asphalia ridens* larvæ. I have taken a few *Eulepia cribrum*, and a fair number of *Toxocampa craccæ* larvæ.—P M. BRIGHT, Roccabruna, Bournemouth. June 10th, 1893.

Clevedon.—Larvæ are very abundant, forest trees being completely stripped of their foliage; birches suffering most. We are having a second edition of the gooseberry saw-fly this spring, committing dreadful havoc amongst the gooseberry and currant bushes, but the other pest, *Abraxas grossulariata*, seems very scarce.—J. MASON, Clevedon. June 14th, 1893.

Isle of Man.—In consequence of staying at Sulby for the past three months, I have not been able to obtain any *Dianthœcia cæsia* this year, but, from what I hear, I do not think I have missed much, as the favourite haunts of this insect (Port Jack, and vicinity) have, during the last few months, been completely destroyed, from an entomologist's point of view, by the formation of a new marine drive, and all the flowers of *Silene maritima* have been buried beneath the débris. There are no flowers to be met with from Port Jack to Onchan, and very few at Groudle, and in all accessible places from Douglas Head Lighthouse to near Pigeon Stream, they have been picked, either by the trippers or by collectors. Mr. Walter Christian, of Douglas, has secured for me during the past fortnight, some larvæ of *D. capsophila*, and I have been obliged to feed these on *Silene inflata*. Whilst collecting

last evening (June 18th) in the garden adjoining Sulby Parsonage, I was most successful in taking a beautiful fresh specimen of *Plusia festucae*, about 9.20, from flowers of red valerian. This is the first specimen I have ever seen in the Island. There was a good breeze blowing all the evening, and moths were attracted to the blossoms of the plant referred to in good numbers. I took also the following: *Plusia chrysitis*, *P. gamma*, *P. iota*, *P. pulchrina*, and a few *Abrostola triplasia*, *Cucullia umbratica* and *D. capsicola*. Sugar has yielded nothing special up to the present time.—H. SHORTEIDGE CLARKE, Sulby Parsonage, Lezayre. June 14th, 1893.

Oxshott.—Field meeting of the South London Entomological and Natural History Society held on Saturday, June 10th, under the guidance of Mr. R. South. The railway is very convenient at this spot, for it lands one right on the collecting ground. Turning to the left on leaving the station, the members quickly dispersed, and among the scattered fir and beech trees, *Eubolia plumbaria* was noted in fine condition; *Epinephele janira*, *E. tithonus*, *Cænonympha pamphilus*, *Syrichthus malæ*, and one or two *Lycæna ægon*, represented the Rhopalocera; from the heather, *Ematurga atomaria*, which has been about so long this year, a few *Aspilates strigillaria*, and an odd specimen of *Nemeophila rursula* were disturbed, while the denser portion yielded *Cabera pusaria*, *Acidalia remutaria*, *Asthenia candidata*, *Camptogramma bilineata* and *Lomaspilis marginata*. In this part of the heath, the sundew (*Drosera rotundifolia*) flourished, and many patches of the parasitical dodder (*Cuscuta epithymum*) were seen. On entering the fir woods proper, going north, members were astonished at the vast numbers of *Bupalus piniaria* and *Thera variata*, which the beating stick produced, many of the former being in fine condition. On the trunks, *Scoparia dubitalis* and *L. truncicolella* were present; one *Ellopiæ prosapiaria*, a few *Macaria liturata*, in fine condition, and plenty of *Eupithecia indigata*, almost unrecognizable. *Iodis lactearia* was flying, and *Retinia pinivorena* was reported. Specimens of the coleopterous family *Coccinellidæ* were observed in all four stages, the pupa stage of *Coccinella oblongo-guttata* being especially noticeable, both for its striking colours and its power of suddenly standing at right angles to the trunk of the tree when disturbed. At length we reached a hedge of variable growth bordering the fir wood, and here *Aplecta nebulosa* and *Melanthia albicillata* were taken from the trees; full-fed larvæ of *Panolis piniperda* were beaten, and *Melanippe montanata*, *M. sociata*, *Larentia viridaria* and *Ebulea sambucalis* were driven out, while *Tortrix viridana* was certainly there. Turning sharply to the left, we reached a damp situation, where *Myrica gale*, so attractive to *Lycenidæ*, grows with *Viola palustris* and *Hydrocotyle vulgaris*. Here we obtained *Cataclysta lemnata* and *Hydrocampa nymphaea*, with a solitary specimen of *Leucania impura*. A beautiful piece of undergrowth was now reached, which, with the adjoining palings, produced considerable numbers both of species and specimens. *Melanthia ocellata*, *Phorodema pustulata*, *Tephrosia punctularia*, among the GEOMETRÆ, and *Triphæna pronuba*, *Noctua c-nigrum*, *Agrotis exclamationis*, *Xylophasia monoglyphæ*, among the NOCTURÆ, were added to our list. A solitary specimen of *Drepana cultvaria* was taken. Among the micros were *Pedicia bilunana*, *P. corticana*, *Eupæcilia nana* and *Elachista argentella*. Many species found before were present here again, including a number of fine specimens of *Melanthia albicillata*. The road was now reached, and

the party turned for tea. The walk produced *Coremia designata* on trunks, a single *Eupistertia oblitterata* from stunted alders, and a nest of *Bombyx neustria*, strange to say, feeding on birch. After a hearty tea at the porter's cottage, we rambled over the heath, taking abundance of *Pempelia palumbella*, with *Eupithecia nanata* sparingly, and one or two *Agrotis porphyrea*; *Acidalia subsericeata* was taken in some numbers just at dusk. Mr. Lewcock, who lost the train, and did not join the party till the return journey, made the following report on the Coleoptera observed:—"I started to meet the 2.17 train, but just missed it by two minutes. Under the circumstances, I decided to take the next train to Surbiton, and walk round by the fields through Claygate to Oxshott, and collect by the way. I arrived at Surbiton about 3.15, and turned to the left coming out of the station, making for the foot-path which skirts the railway bank, and eventually turned into Claygate Lane. Having on one occasion seen a specimen of *Megapenthes lunicollis* taken almost under my nose in this lane, I began working for it, but without success. However, I found a single *Mordellistena humeralis* sitting on *Heracleum* flowers, and I may here record that I also obtained one on June 20th, 1891, at the Eynesford excursion. In other Umbelliferae, I found several *Grammoptera tabacicolor*, a species common to this locality. In elder blossom, one *Quedius cruentus*, which occurs sometimes under bark, but only singly; also several *Anthocomus fasciatus*, a pretty little red and black malacoderm which is frequently found during June at Claygate. By using the sweeping net among the meadow plants, several *Ceuthorhynchus campestris* and *Prasocuris aucta* turned up, with a few *Ceuthorhynchus cochleariae*, *Gymnetron pascuorum*, and several *Apions*. All these are common to the locality. Of course, one meets with many species over and over again by working at one place, and it would be quite useless to record all the species found there; for instance, I met with ten species of *Telephorus*, and, with the exception of *T. fuscicornis* and *T. discoideus*, all are common. It may be worthy of remark that at Eynesford, in 1891, *T. fuscicornis* was the commonest of the group in that district. Another very common beetle on birch, hornbeam and a variety of things at Claygate, is *Luperus betulinus*, and common enough it was on Saturday, falling literally in hundreds into the umbrella. The Black Pond was reached soon after 7 o'clock, but nearly all *Donaciae* had retired for the day, so that only *D. sericea*, with the intermediate forms to *D. comari* were to be obtained. Two or three *Coccinella ocellata* were found on the reeds, and one or two *Erirhinus nereis*. The final capture was a nice specimen of *Cryptocephalus lineola*, making the third captured at this spot by myself. A great many odd and common things put in an appearance, such as *Adimonia caprae*, *Strophosonius limbatus*, but these captures are all decidedly uninteresting." This ended another very successful and pleasant field outing of this Society. The next meeting will be at Westerham, Kent, on July 15th.—HY. J. TURNER (for the Committee).

Lake District.—I did a little collecting in the Lake District during the latter end of May and the beginning of June, and had the common experience of finding insects out unusually early this year. On May 26th, at Witherslack, I took *Leucophasia sinapis*, a little the worse for wear, and on the well-known hillside near the Derby Arms, I took *Lycena albus* and *L. var. salmacis*. *Melanthia albicollata* was just coming out and in lovely condition, and *Venilia maculata* was common in one

situation. On May 27th I went to a spot near Lakeside, Windermere, which I have worked for years, and which is productive of *Argynnis euphrosyne*, *selene*, *aglaia* and *adippe* also *Nemeobius lucina*. I found *euphrosyne* over and *selene* fully out and in swarms, and as *lucina* was absent from its accustomed spot, I concluded it was over. A subsequent visit to this place on June 7th showed *selene* to be practically over, and *aglaia* reigned in its stead. On June 8th I went to a large moss between Ulverston and Haverthwaite, and found *Chortobius davus* fully out. These were very dark forms, with the ocelli showing distinctly on the upper surface. They much resemble the forms taken at Heysham, being, if anything, a trifle darker. *Aspilates strigillata* was excessively abundant here, also *Nemeophila russula* and an occasional *N. plantaginis*. On the borders of this moss, in grassy places, *Hydrelia umca* was out in fair quantity and perfect condition. Among other things, I took a good series of *Anaitis plagiata* near Arnside, and was surprised to notice *Zygæna filipendulæ* fully out on the railway banks near Grange on 3rd June.—B. H. CRABTREE. The Oaklands, Grange Avenue, Levenshulme.

Oxfordshire.—Insects are all a month early here. Sugar is a complete failure. I have only taken two *Agrotis exclamatoris* and one *Gonoptera libatrix* this season at it. Evening netting and beating by day produce a fair number of Geometers. My moth trap has been doing well. Thanks to it, I have secured nice series of *Nemoria reticulata*, *Alecta advena* and *Nudaria mundana*, together with a host of others. *Anticlea rubidata* and *Coremia quadrifasciata* have turned up in one hedge. *Melanippe procellata* is in good condition among *Clematis*. *Scotosia vetulata* is getting worn, but is still present in some numbers. I have only taken one *Chærocampa elpenor* this year at honeysuckle, but have had five or six *Sphinx ligustri* and a *C. porcellus* from Berkshire. Butterflies appear to be scarce in this neighbourhood.—J. H. D. BEALES, Kiddington Rectory, Woodstock. June 23rd, 1893.

Wicken.—A couple of days at Wicken on the 17th and 18th June, produced rather better results, so far as sugar was concerned, than my former visit in May (*Ent. Rec.*, iv., p. 176). I was fortunate enough to take on the first evening a very fine specimen of *Cymatophora octogesima* at sugar. Common Nocturæ were out in fair numbers, though not so numerous as one sometimes finds them on the Fens. Amongst those which came to sugar were, *Acronycta tridens* (or *psi*?), *A. mega-cephala* (1), *Leucania impudens* (common), *L. comma*, *L. pallens* (common), *Xylophasia lithoxylea*, *Mamestra sordida* (?), *Apamea gemina*, *Miana strigilis* and var. *æthiops* (common), *M. fasciuncula*, *Caradrina morpheus*, *C. quadripunctata*, *Rusina tenebrosa*, *Agrotis segetum*, *A. exclamatoris*, *Noctua augur* (common), *N. plecta*, *N. c-nigrum*, *N. festiva*, *Triphæna pronuba*, *Alecta advena* (a few, but it was over and they were worn), *Hadenia oleracea* (common), and *H. pisi* (1). Of the GEOMETRÆ I took very few, viz.:—*Epione apiciaria*, *Metrocampa margaritaria*, *Pericallia syringaria*, *Emmelesia alchemillata* (1), *Eupithecia rectangulata* (common), *Collix sparsata*, *Camptogramma bilineata* (very common), *Scotosia rhamnata* (1), *Cidaria fulvata* and *C. dotata*. Beyond picking up a few larvæ of *Papilio machaon* (which were well forward and are now beginning to pupate), one afternoon, I did no day work.—HENRY A. HILL, 132, Haverstock Hill, Hampstead, N.W. June 30th, 1893.

Leigh.—On July 1st I went in company with two friends to Leigh (Essex) to see if *Hesperia lineola* was yet out. We did not see one, although *H. thaumas* and *Arge galatea* were in fair numbers, the latter being very tattered. Of Rhopalocera we saw a few *Lycæna icarus*, including one female; *Pieris brassicae* and *P. rapæ*; a few *Vanessa urticae* round the castle; traces of the larvæ of *V. cardui* on the sea wall; *Epinephele janira* in considerable numbers, but no bleached ones among them, this being the place where so many have been taken; one or two *E. tithonus*; and *Cænonympha pamphilus*, large and pale; The Sphingidæ were represented by that frequenter of ruins, *Macroglossa stellatarum*, of which one specimen was captured, and innumerable cocoons of *Zygæna filipendulæ*. Among the Bombyces, I took a female *Lithosia complana*, which has laid a good batch of eggs, and one *Cilix glaucata*. *Euclidia mi*, a single specimen, with a number of *Hypena proboscidalis*, also showed up. Of Geometers, *Uropteryx sambucata*; *Angerona prunaria*, a couple of males; several *Hemithea strigata*, a female of which has laid a good batch of eggs; *Acidalia bisetata*, *A. trigeminata*, *A. interjectaria*, *A. virgularia*, *A. remutaria*, with a nice banded *A. aversata*, which has laid a fair number of eggs; *A. immutata*, strange to say, was absent; *Abraxas grossulariata*, one, with plenty of *Camptogramma bilineata*, very worn; a specimen of *Cidaria fulvata*, and some very dark *Eubolia limitata* put in an appearance. The Pyrales taken were *Cledeobia angustalis*, *Scoparia dubitalis*, *Pyrausta purpuralis* and *P. ostrinalis*, plenty of *Herbula cespitalis*, and a single *Endrotricha flammealis*, *Eurrhyncha urticata*, *Scopula olivialis* and *S. prunalis*, whilst *Botys ruralis* and *Ebulea crocealis* were the Botydæ taken. Two species of Pterophori, *Acipitilia pentadactyla* and *Platyptilia ochrodactyla* (?) appeared in single specimens. *Crambus culmellus* with *C. perlellus* were exceedingly common. I only saw a few *Mychopeila cribrum*, and not a single *Homæosoma binævella*, which I had hoped to get. I netted but few Tortrices, although they were abundant, as well as the Tineina. It has been stated that entomologists have repeatedly been expelled from the fields round Hadleigh Castle; however, we rambled where we thought fit without interruption. It may have been that a visit to the fine refreshment room of the Booth colony, of which the ground forms a part, was of service to us.—HY. J. TURNER, Hatcham, S.E. July 2nd.

Wicken.—I went to Wicken on the 14th June, and had, we were told by the local men, about the best week of this season. The first night I was there was the best for light they had had the whole season, and I took 10 *Nascia ciliata* among a lot of other things. Sugar, too, was very good. *Aplecta advena* continued abundant during all our stay, and I could have taken any number; it was almost the commonest NOCTUA at sugar and on hop leaves in Mrs. Phillips' garden. *Leucania pudorina* was in swarms, and in perfect condition. *Agrotis ravidia* came to sugar, two, the first night, and several were taken on future evenings. Surely this was very early for a July and August moth. Several *Macrogaster arundinis* came to light, and *Herminia cribralis*, *Collix sparsata*, *Epione apiciaria* abounded all over the Fen. On the 22nd we went to Hunstanton, when on the Friday afternoon (the 23rd) I beat out 4 ♀ *Eupithecia extensaria* from the same ditch in which I found the larvæ so freely in 1889; all deposited a few eggs.—GNO. T. PORRITT. July 5th, 1893.

Isle of Wight.—After my very unsuccessful experiences at Wicken,

it was a great pleasure that I arrived again at Freshwater, June 7th, in company with my brother, and Mr. Abbott of Birmingham, to begin collecting seriously, and we soon found congenial employment, that was indeed welcome after our monotonous failure of the previous week, which we, endeavouring to keep our spirits up by ill-timed merriment, were wont to compare to visits to a succession of cemeteries, full of memorials of species, either long departed, or temporarily absent. We had been so accustomed to be treated as tourists, whose only ambition was to see such spots as where the very last *Laelia caenosa* had been taken—varied by the exact location where *Hydrilla palustris* might be expected, and as a special refresher, the chosen haunts (in any season but this), of such good local species as *Agrophila sulphuralis* and *Lithostege griseata*, conspicuous only by their complete absence, that it was with renewed vigour that we repaired to grounds which, although small, might be relied upon to provide a respectable “bag.” To save time, we came straight through London and on at once to our destination, where we arrived about 4.30 p.m., eager to retrieve our reputation. Thinking of the early season, our first visit was made the same evening to “the swamp” for *Acidalia emutaria*, which we found at once, flying more freely than usual, and of which we secured over sixty, unfortunately, not even then freshly emerged, although quite a fortnight before my usual first visit. Sugar proved disappointing in the adjacent wood, owing, doubtless, to the universal abundance of honeydew; and this has continued up till the date of writing (July 4th), when I am hoping that a very heavy thunderstorm, now passing, may be the precursor of more success. The lamp and sheet were put to work, but without much result; a fine ♂ *Geometra papilionaria*, and one *Notodonta dromedarius*, being the most noteworthy visitors, during the few evenings that we tried them. *Toxocampa pastinum* was the next insect specially worked for, and, this also, proved itself to be in unusual abundance, although extremely local. Several evenings in succession we obtained a large number of specimens in the very finest condition, and over a remarkably small area of ground. Their flight commenced about 9 p.m., and continued on one warm evening till past midnight, but usually ceased about 10.30 at the latest. In the later flight, they came freely to our hand-lamps, and also to our Fen lamp, when lowered to the ground; but this method of collecting we had to abandon, owing to the fierce attacks of the swarms of gnats, which were in absolute clouds round the light. We also took at the light an occasional *Cleora lichenaria*, and *Ellopia fasciaria*, with the usual abundance of *Iodis lactearia*, and other common things. During the remainder of June, we made but occasional visits to this locality, devoting more time to the Downs; but I took a few *Phorodesma bajularia*, *Angerona prunaria*, etc. Amongst the plumes *Agdistis bennettii* was netted, but did not occur in its usual profusion, possibly not being fully out. An occasional *Charocampa elpenor* was also netted, but positively nothing at sugar there. We continued trying the Downs, where *Agrotis corticea* came freely to sugar, and were quite surprised to note the first occurrence of *A. lunigera* on June 9th, *A. lucerneae* following next night. These three species continued to maintain their character, as confirmed visitors to the artificial sweets, during the next ten days, with the result of a good long series of each, but since about the 24th they have got very much more scarce, and last night, (July 3rd), I only saw one of the last-

named, and no *lunigera* at all. Possibly they may again put in an appearance, considering that the middle of July is, as a rule, the best time for the two better species named. I devoted several evenings specially to working for the new species of *Acidalia*, but was very unfortunate with the weather, which broke up the very same evening that the first two specimens were netted, one by Rev. C. T. Crutwell, working with me, and the other by myself. Owing to the very exposed nature of the ground, still, warm evenings are almost essential to the capture of this pretty little species, which, after careful examination of the short series I succeeded in securing, appears most indubitably distinct, and is a most welcome addition to the British list. In the figure given in the plate published in the February issue, the transverse wavy bars are coloured much too red, thereby not contrasting sufficiently with the very conspicuous brick-red streak on the costa, which is a constant and distinguishing feature in good specimens. Amongst Pyrales, *Pyrausta ostrinalis* and *cingulalis* are very common, together with *Stenia punctalis*, rarer, and *Botys flavalis*, which last is just appearing, as is also *Lycæna corydon*, making a very early start. An excursion for *Setina irrorella*, early in June, proved a complete failure, as did also, an early morning search for *Agrotis cinerea*, which I fancy is but scarce here, although an occasional visitor to sugar. Another failure, was a special long-distance excursion for *A. ripæ*, which was evidently long over, as the only one captured was very worn. Doubtless the larvæ will be as plentiful as ever this autumn. The second brood of *S. irrorella* being now out, I am only waiting a suitable morning to go down to my usual ground near the Needles, after the same, hoping to turn up, if favoured by fortune, the rare IVI variety; but the spot being very exposed, a landing can only be effected in calm weather. *Acipitilia spilodactyla* was out before the middle of June; another "record" for earliness; and about the same date, two trips to Parkhurst Forest, produced a fine series of *Limenitis sibylla*, which was even then getting worn; we also secured at the same place, occasional specimens of *Gnophria rubricollis*, *Ellopiæ fasciaria*, *Phorodesma bajularia*, etc. The weather appears very unsettled again, and in my opinion, the best part of the real summer season is past. I trust, however, that second broods, together with more success with "treacle," may keep us busy until the autumn sport begins again. An hour and a half spent in search for *Nonagria geminipuncta*, this morning, resulted in finding about twenty pupæ; they appear scarce at present, but are possibly backward owing to the protracted dry weather.—ALBERT J. HODGES. July 4th, 1893.

SOCIETIES.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—Tuesday, 20th June, 1893.—Exhibits:—Mr. Clark, larvæ of *Endromis versicolor*, a dark variety of *Hemerophila abruptaria* from Hackney, and specimens of *Spilosoma menthastræ* with very few black spots. The latter were bred from a sparsely spotted specimen captured in the New Forest, but the majority of the brood were normal, only two or three following the ♀ parent. Dr. Buckell, examples of the two broods of *Ephyra punctaria* and series of *Eupithecia centaureata (oblongata)* bred from the egg, on which he read some notes. "The female was taken on

14th August, 1892, and the eggs were deposited the next day, being ovoid in shape, one orange and the rest whitish. On August 16th they were all orange, and some had become pitted on the exposed surface, while on August 19th all were pitted. On August 21st they had become lead coloured, and hatched later in the day. The larvæ which were fed throughout on the flowers of marigold appeared (on August 27th) to have the head smaller than the second segment, and the body composed of alternate pale and dark lines. On September 12th they varied much, and might be divided into four groups: (1) Consisting of three specimens, had the head brown, the body being dull green, with a purplish medio-dorsal band, and a less distinct band of the same shade midway between the medio-dorsal band and the spiracles, a line from each spiracle, joining the last mentioned band at the anterior part of each segment. (2) Body white, with the same markings as No. 1. (3) Body white, with the bands of a reddish hue. (4) Body white, only the medio-dorsal line present, and that but faintly marked. On September 18th most of the larvæ had spun up in the sawdust, and on September 26th all were in pupa. The imagines emerged from 5th to 21st May, 1893, mostly in the night and early morning." With regard to this species, Dr. Buckell observed that, although conforming to the usual type of the genus in the shape of its wings and its resting position, it was remarkable for its light colour and want of the usual transverse lines. In colour, however, it was nearest approached by *E. succenturiata* and *E. irriguata*, while the markings resembled those of *Emmelesia blandiata*. With regard to its variation, there was a tendency towards the development of a central transverse band, and he suggested that possibly specimens occurred with this quite complete. Mr. Battley exhibited a pupa of *Anthocharis cardamines* and three melanic specimens of *Stauropus fagi* bred from the eggs found at Epping Forest in July, 1892. He stated that all the specimens (7) bred from these eggs had proved to be of this variety, and further pointed out that the dark colour was chiefly developed on the upper wings and the front margin of the hind wings, these being the parts exposed when the insect is at rest. Mr. Bacot, a melanic specimen of *S. fagi* bred from an Epping Forest larva, also *Notodonta trepida* and young larvæ of the same from the New Forest. Capt. Thompson, a melanic specimen of *Chrysoclysta linneella* and a series of *Phorodesma bajularia* from Epping Forest. He stated that he had tried "assembling" with two bred females of the latter species, but although he took several males during the evening, they did not appear to be attracted by the females. Coleoptera:—Mr. Heasler, *Toxotus meridianus*, *Molorchus minor*, and *Cryptocephalus fulcratus*. Mr. Lewcock, *Telephorus paludosus* received from Mr. A. J. Chitty; also various species from Woking and Farnham. Dr. Sequeira stated that he had visited Wicken Fen, and found *Papilio machaon* in all its stages, it having been on the wing since the beginning of April. Mr. Battley stated two larvæ found in the stems of ribbon grass, and which he had thought to be *Apamea ophiogramma*, had emerged, and proved to be *Miana strigilis* var. *æthiops*, the only difference noticed in the larva being that *strigilis* had faint traces of longitudinal lines. Mr. Tremayne reported that some *Clostera anachoreta* larvæ had spun up, and the imagines emerged eight days afterwards. Mr. Smith had bred *Thecla quercus* from larvæ taken in the New Forest at Whitsuntide.—

A. U. BATTLEY & J. A. SIMES, *Hon. Secs.*

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SPRING COLLECTING AT LYNDBURST.

By REV. G. M. A. HEWETT, M.A.

By some oversight Nature made me a sleepy man, nor has a considerable course of compulsory rising in the immediate vicinity of 6.30 done anything to draw the desire for sleep out of my blood. Consequently on the morning of a Leave-out Day, there is always a battle, because the train to Lyndhurst starts at 8.25, which means breakfast at 7.30 or earlier. 'What is the good of a Leave-out Day,' argues my sleepy brain, 'if I only score a beggarly quarter of an hour in bed?' 'Get out and look what sort of a day it is,' suggests Diplomacy: and after some argument, the suggestion is generally accepted, and then it is hardly worth getting into bed again. I am rather afraid that some day my sleepy half will begin to understand the trick, and refuse to turn out, but it is always so very sleepy, that Diplomacy fights under great advantages.

Well! It was a fine May-day morning. Diplomacy had won pretty easily, as the Term was young and sleep had been appeased by many sacrifices in the Easter holidays, I had more time than usual for breakfast, and caught the train comfortably. Now that I have got so far, I must pluralise myself: I expect we shall eventually be three—Self, A and B. You can choose your own letters, but just at present they have a majority of two to one as they stand. Of course, in the train we are very plural, but for lots of reasons, 'we' shall dwindle down to three, or at most four, at Lyndhurst. It is a big place, but even three is a lot to work together in harmony. Besides, it just makes odd man out for any special bug that may happen to be common property. Also, the Graces were three. For all these reasons I recommend you to be three.

We have to wait for twenty minutes at Eastleigh, and will plan out our day. It is well to have a plan and not work promiscuously. But even a whole day is short for a plan. We shall have to limit our area, and not waste time in getting from place to place. Another day we will go somewhere else. Meanwhile here is our train. The plan will come out when we get there. It is a dawdling train for eager bug-hunters, but what a pretty bit of line. We must make it high water, without consulting almanacks, which is risky, but we are above criticism in spreading a trifle of mist over the water. These pictorial

effects are allowed in the highest circles of art. It is like the gauze veil across the stage to soften the tableau. And what a tableau it is! I really must be allowed one note of exclamation. Firstly water, lots of water, coming along out of the misty distance, and lapping on the very railway. What a pity we cannot stop the train and have a swim. No kicking of heels, but a dream-swim, where we put our cheek down on the water, and feel it moving, and hear it talking, and swim right on. That is the kind of swim for a morning like this. I don't know what there is in salt water that always maddens me—it is very nasty to swallow, and I get tired of the sea after two or three days. But the first peep like this always makes me feel 'all-overish,' and anxious to do something worthy of the occasion. Well! our tableau is taking too long. But you may just as well look at Southampton kicking its heels in the water, like a rather dirty red and brown little boy. You'll think it picturesque if you try long enough. And ships of all sorts and sizes make a very charming background to the stage, with a dim line of woodland on the right. And round goes the sleepy old train, right into the green heart of this very woodland, first through meadows with big oaks in the hedges, and primrose banks, and a brown stream with alders, then past acres of Scotch firs, which send their scent right into the carriage window, and then straight into a great aisle of trunks, like—well! like a ball, or whatever you call that lump of wood, shaped like a cheese, into a group of skittles. I make no apologies for the simile, because we are getting well past Lyndhurst Road Station, and must do something desperate to stop ourselves. Besides, there is some delicious moorland ahead, which I should dearly like to talk about, and several of you know your line far too well for me to alter the position of the station, so as to work it in.

I'll have my revenge though, for we'll go there first. Is it an ancestral custom, or school rules, written or unwritten, which makes you come in flannel trousers instead of knickerbockers and gaiters? You won't find the long heather very nice. However, come along, you'll find plenty of *Boarmia cinctaria* on the trunks of those dwarf firs among the heather. Take your own line please, and don't cut across to likely looking trees in mine; they are often on the very smallest ones. Aren't they hard to see at first, with their wings flat along the bark, just the colour of the trunk? Shall you look on other trees? Certainly! the larva feeds on the heather and not on the firs. Some of the moths have great white bands on the wings, quite different from the type. They are easy to see, and rare probably for that reason. I shouldn't wonder if they are survivals of an older type. But I'm not sure of my tree knowledge. Aren't all these firs an artificial growth, and was not the birch the old original scrub here? There are old birches right out among the heather—not many, but enough for a theory, and all the firs are young. If this is right, the pale birch stems would protect a pale moth. In those days perhaps *cinctaria* were pale-coloured, lighter even than that very white one you took. Then came the fir, and *cinctaria* liked sitting on them too. And so the darker ones (those, I mean, that are accidentally a trifle darker) got off without being seen. And as the firs drove the birches out, it was the lighter ones that got scored off. And so they got gradually more and more like the fir trunks, because the likeliest ones escaped the birds and the children took after their papas and mammas. And now I

expect we all of us miss a good many, because they are so exactly the colour. I daresay the light ones are the most like to their great-great-grandmothers. Anyhow it is a great joy to start a theory. Do the light ones sit on the light trees, and the dark ones on the dark trees? Well! do they? No. I think that goes to answer people who still say that these things make themselves like their surroundings on purpose. But then there are a few miserable beasts, like the chameleon, which can change colour all in a moment, and be green when they are sitting on grass and grey when they are sitting on stones. There are two lines for you to work out. Take your pick, but make some theories when you get the chance. It is very good fun, and may be useful. Have you found as many as you want? If so let us leave the rest, to make material for more theories.

What shall we do now? There are a few male *Saturnia carpinii* flying over the heather—but it is getting hot and they are worn by this time. Also they are going a good deal faster over the heather than you and your trousers will go through it. Better wait and get the larvæ in August or September. If you could bring a bred female here, you'd have the males of the whole country crawling over your hands and arms. How they find you out I can't say; but they do. I've done it, and they come in crowds from all points of the compass. Nor is the phenomenon confined to this insect or this genus. The peculiarity is that all this genus, *except* one or two, exhibit it, and stray species, here and there, out of other genera. Perhaps it is more general than we imagine. Now that entomologists breed more insects, they are making fresh discoveries. I don't think that the time has come yet for much of a theory, but it may come any time, so be on the look out. There is a chance for you; but you must enter the lists and not just look on. Breed females and put them into a muslin bag and take them out into country where you know the males are, and watch where they come from. *Stauropus fagi* seem to come down from the tree tops, others rise out of the ground. You'll learn something of their habits at any rate.

Let's go to that alder-bed and beat for larvæ of *Geometra papilionaria*. You'd better roll your trousers up to your knee, as the country is somewhat moist. Another time bring a pair of canvas shoes to do this sort of work in, and keep your boots dry; you can leave them at the pub. It's hard work beating alders, with a quaking bog under your feet, and it looks foolish work, as the leaves are only just showing. But the larvæ are there, and have been since the autumn. You will have to keep your eyes open here too. They are a very exact imitation, in their small stages, of the little stumpy red chips of the alder twigs. You will pass some over, even in the beating tray. Later on, as the leaves come out, they take a bright green skin, and they have an intermediate stage, just about now, when they are red, with a green crest along their back, painfully like the leaf just breaking out of its sheath. If you haven't seen them in all their stages you will think that I am talking nonsense,—but wait a bit. When they are full-grown, some are green and some are brownish, just like the catkins of the alders and birches, especially the latter, on which also they feed. Upon my word, it looks as if I were colouring and shaping the larvæ to suit the trees, but I really don't think I am: the imitation is so very exact. But theories here are much harder to make.

It is easy enough to get the young autumn and spring larvæ exactly like the twigs. They grew that way in time, by the twigs protecting special individuals by their resemblance. But, when the change of skin came, that green crest to resemble the leaf just breaking, and then the final change, according to taste, green or brown, look very like premeditation. Lots of these hibernating larvæ do it. To mention one—a cousin of this, by the way—*vernaria*, on the wild clematis, in the autumn and early spring, is a little thin brown larva, which sits quite stiff, just like the dry withered stumps of leaf and tendril stalk. When the new leaf-stalks and tendrils begin to shoot it changes to green. And the eggs of the moth are like little green cheeses, piled one on the top of the other, exactly like a closely-folded tendril. What will you make of behaviour of this class? Don't give it up! I expect Nature's riddles always have rather a good answer. The more instances we can get, the better chance is there of finding some answer. Perhaps there are more answers than one.

How many have you got? Larvæ, I mean, not answers. Two dozen? Well, that will have to be enough. Keep them with plenty of fresh birch, as you can't get alder at Winchester, and give them some dry moss to spin among.

Now let's have lunch, as it is getting on for two o'clock. We won't be long, but I do like ten minutes' rest. There are lots of other things which we might have done this morning. But one can't do everything, and I wanted some of those banded *cinctaria*. I expect *Lycæna argiolus* was still out among the hollies, and we might have gone into the woods and worked the honeysuckle for larvæ of *Pericallia syringaria* and *Limenitis sibylla*; there would have been plenty of the latter, and a few of the former. The worst of that game is, that you can't very well beat either, and searching is such hard work. *Sibylla* never leave go of the branch, and *syringaria* are too far inside the big branches, and too near the ground on the trailing stuff. Also, at the first touch, they drop on to a thread. So that, unless you get the right bit first, off they all go. But, in case you want to vary your day, as you may do, go into any of the woods and oil your knee-joints. Be very careful not to touch the trailers. It will be hard work, as no larvæ are easy to see. *Sibylla* are green now, though they hibernate brown, with red spines. Look out for eaten leaves, and then search the stems round about. Leaves recently eaten generally have minute drops of juice along the edge. *Syringaria* are all shades of greenish or brownish, down to deep red. They sit with their head between their heels, and have two tails in the middle of their back. They are generally at least six inches away from the place where they have been feeding, on the stem, and are very hard indeed to see. You may beat one now and then. At any rate, after you have searched any bush, open your tray and beat a little. You are sure to get some nice larvæ of *Boarmia repandata*, and may breed var. *conversaria*. There is one very tiring alternative morning's work.

I had better give you one more, for variety's sake. You may go among the big oaks and thorn bushes near the Station, and beat for *lichenaria*, anywhere where you see the branches covered with lichen. This is very plain work, as the larvæ come easily into the tray, and the lichen doesn't. If they came together, it would be nearly impossible; as, even in a pot of lichen, with twenty or thirty larvæ in, I cannot see

the larvæ, so exactly do they resemble their food. You will get them out of the thorns, oaks and beeches, or any tree that grows lichen. I need not describe the larvæ. Pick up all the bits of lichen in your tray, and they will probably be larvæ of *lichenaria*. You had better bring home a box of lichen and keep it just moist. It will last them till they pupate. At the same time you will get larvæ of *Miselia oxyacanthæ* out of the thorns, you can tell them by the way they wriggle; and larvæ of *Boarmia roboraria* out of the oaks, with a split in the front of their heads. They both feed on the leaves, and want a pot with earth in. When you are tired of this, go on to the railway bridge, and beat willows. You just may get *Apatura iris* larvæ, with two horns on his head, and also larvæ of *Pæcilocampa populi* and *Trichura crategi*, small woolly men, these latter. And if there is any time left before lunch, you can go out on to the heather and run after *carpini*, to get up an appetite, or take in a piece of one of the alternative mornings.

I think our ten minutes is over and we can proceed. We might do anything that I have mentioned above, but I may as well go on to the one piece of work which I have not yet talked about. We'll go into those fir plantations over the road. Keep your net handy if you want *Pararge ægeria*, as the spring brood is just out and you will probably also see *alveolus*. I want to beat the pines for *Ellopiæ fasciaria* larvæ. Any of the rides will do. They are red and segmented, just like the red tips of the fir branches. You may also beat a late imago of *Trachea piniperda* and are sure to beat the green larva of *Thera variata*. There will also be the much rarer larva of *firmata*—with a red head and smaller than *variata*. Tedious little beasts to keep they are, as they grow very slowly, and fir is scarce at Winchester. I don't think there is any real Scotch fir nearer than St. Cross, by the river. Luckily fir in damp sand lasts a long while. Bring some home from here, to give you a fair start, and put it into the pot in small pieces, otherwise, when you come to change the food, you will never find your larvæ. And mind you don't throw away the green pupa of *variata*, lying along one of the needles of the fir, near the base. *Fasciaria* also spins among the needles, but the pupa is red and easily seen. *Firmata* will want earth or sand.

Well! That's not a bad day. We'll have some tea at the pub, and see what the other men have got. I don't think there is very much beyond what I have mentioned. Too tired to admire scenery on the way home, besides it is low water and mud is not picturesque. Get your larvæ into pots before the night if you can, and pin your insects straight and stick them into a relaxing box; you can set them tomorrow. Au Revoir.

STRAY NOTES ON CERTAIN SPECIES OF BUTTERFLIES.

By J. W. TUTT, F.E.S.

Slow colour changes in the pupal wing of Lasiommata megæra.—In nothing have I been more interested than in the observation of the colour changes in the pupal wing of the green form of *Lasiommata megæra* just previous to emergence. The first change in the wing is from the bright green of the normal pupa to a dull yellowish-buff, which is spread uniformly over the wing. The second change is the develop-

ment of purplish markings; these fill up, as it were, most of the central area of the wing, leaving a pale margin along the costa, the outer margin and the inner margin, extending towards the outer margin just as far as "Poulton's line." There is, however, a pale transverse band running through this, and two or three pale costal streaks. The developing imaginal wing at this time appears to occupy only this central space, but the fact is remarkable that the purple parts of the pupal wing correspond with and, as it were, replace, the normally paler (brown) parts of the imaginal wing, whilst the black parts of the imaginal wing still remain of the same pale buff coloration, as was the whole of the pupa after its first colour change. The next phase is a most interesting one, the purple parts change to a rich brown, and the previously pale margins, costal spots and central band now become black, the ocellus becomes conspicuous in the outer brown area, the whole wing being now a facsimile of the imaginal, and occupying clearly the whole space of the pupal wing, the extremely black outer margin of the imaginal wing being (as I have previously remarked about other pupæ) entirely outside "Poulton's line." The development of colour might easily delude a superficial observer into the belief that the wing, on the day before emergence, really only occupied the central area of the wing, as the brown parts of the wing, which are ultimately the paler parts of the mature wing, are then the only dark parts, the absolutely black parts of the mature wing developing very rapidly at the end. However, it is clear that by the time this stage of colour change is reached, according to Dr. Chapman's view, the imaginal wing has been pushed out to the limits of the pupal wing. The final colour-change takes place in the dorsal and abdominal areas, which pass through buff into a dull leaden colour with the slightest suspicion of a purplish flush.

Pupal wing of L. megæra.—The pupal wing of *L. megæra* has most conspicuously, just previous to emergence, the dark outer margin of the imaginal forewing almost entirely outside "Poulton's line." At the extreme margin the seven pale lunular fringe patches are very distinct, much more so than in the fully-developed wings. The only point of the pupal wing not fully occupied by the imaginal is the angulated apex, the apical fringe not quite reaching its extremity. The distinctness of the fringe just before emergence is due to the fact that the pale lunular fringe patches are pushed upwards in the folding. The imago emerged whilst I was holding the pupa, and the fact was undoubted, that the fringe was then quite at the margin, far beyond "Poulton's line." The angular apex appears to be an antiquated remnant borrowed from the *Nymphalidæ*, and suggests rather the degeneracy of the *Satyridæ* from the *Nymphalidæ*, than the development of the latter from the former.

Sudden emergence of the imago and dehiscence of the pupa of L. megæra.—I was at the window examining a pupa with the lens, when it broke simultaneously between the costa of the wing and antenna on either side ventrally, and in front of the prothorax dorsally. The piece consisting of the head, antennæ, legs and maxillæ was suddenly twisted to the left, and was kept attached to the other part by a thin white membrane, the covering of the parts inside of pupal case, although the pieces are otherwise quite separate.

Dehiscence of Satyrid pupæ.—*Satyrus semele* has the membrane just mentioned as being present as an inside lining to the pupa of *L. megæra*,

but dehiscence further takes place longitudinally down the centre of the thorax dorsally, then transversely between the metathoracic (3rd thoracic) segment and the first abdominal, being continued down the line separating the hind wing from the abdomen. There are thus four distinct parts:—(1). The abdomen. (2). The antennæ, legs, maxillæ and head. (3 and 4). The fore and hind wings on one side, with half the pro-, meso- and meta-thoracic segments for that side, the latter attached to wings on the same side. These four parts all fall apart on the emergence of the imago. The dehiscence of *L. ægeria* differs from that of *L. mægera*, inasmuch as it splits medio-dorsally down the thoracic segment, and then runs for a short distance between the base of the wings and abdominal segments. None of the pieces separate, however. Compared with the dehiscence of *L. mægera* just described, we find that the pupa of *Melanargia galatea* appears to have the membrane ill-developed, and the piece (consisting of head, antennæ, legs and maxillæ) falls off on dehiscence, but remains entire and does not break up as in *S. semele*.

Dimorphism in pupæ of L. ægeria and L. mægera.—The pupæ of *L. ægeria* are of two very distinct forms, one a bright green, the other of a pale grey. Of some larvæ sent to me by Mr. Wolfe, four pupated, producing ultimately three grey and one green, with no variation noticeable in the resultant imagines. Writing to Mr. Wolfe about the matter, I found he was aware of both forms, and stated that, in his opinion, the proportion was about three dark to four green. Mr. Wolfe and Colonel Le Grice also sent me a supply of *L. mægera* ova and larvæ. Some of these I sent to Dr. Chapman, and of my own examples I got but two into pupa. One I killed when making some observations on it at the actual time of pupation, the other, which was green at the time of changing, became in a few hours of a beautiful rich velvety black colour, but with the characteristic white tubercular dorsal spots. I again wrote to Mr. Wolfe, and he informed me that he had never seen a black one, and at the same time forwarded me three green ones, the only colour he knew. I suppose I must consider myself very fortunate in getting this melanic specimen, although I should not suppose that it was so rare as appearances would suggest. It was perfectly healthy, and produced a fine female specimen on July 12th.

The imaginal and pupal antennæ of Lasiommata mægera.—The fact recorded concerning the antenna of *Gonepteryx rhamni* last month is not at all isolated, and perhaps, if properly observed at the right time, will be found to be pretty general. The pupal antenna of *L. mægera* reaches to the apex of the wing, narrowing somewhat before the tip. The imaginal antenna, just before emergence, is shorter than the pupal antenna by the length of this narrower tip, the knob of the enclosed imaginal antenna occupying the broadest part of the pupal antenna just before the narrowing takes place. This has almost as important a significance in connection with other Satyrid pupæ as has that of *Gonepteryx* with the *Pieridæ*, for, in the Hesperid group of the Satyrids (*ante*, p. 192), the pupal antennæ do not reach the apex of the wing, but end nearly at that point at which we find the imaginal antenna terminating in *Lasiommata*. The Nymphalid-Satyridæ, therefore, form a connecting link between the true Nymphalid antenna (say *Vanessa*) in which the imaginal and pupal are of the same length, and reach in the pupa the apex of the wing, and that of the Hesperid-

Satyridæ which in the pupa has the antenna as long as that of the imago, but not reaching the apex of the wings.

Pupal wing of Vanessa atalanta.—At the point of emergence, the imaginal wing (inside the pupal) is very distinct, and has been pushed out so that the outer margin of the wing extends beyond "Poulton's line" to the extreme pupal outer margin. The fringe does not at this point occupy the whole of the area beyond "Poulton's line" to the pupal outer margin, but a rather larger proportion than in *V. io*. Three lunular patches of pale fringe are conspicuous near the apex, separated from each other by darker patches; the angle of the wing is practically obsolete, although one traces a dark fold extending from the angle in "Poulton's line" to the outer margin, but below this the pale fringe lunules again become clear, especially the two directly below the point where the angle will be developed on emergence; two other pale lunular fringe marks, distinct but smaller than those directly above, are nearer the anal angle.

Medio-dorsal row of tubercular points in pupa of V. atalanta.—The larva of *V. atalanta* differs remarkably from that of *V. io* in the presence of a medio-dorsal row of spines on the anterior part of each of the abdominal segments in the former, of which there is no trace in the latter. The pupa of *V. atalanta* has these replaced by a tiny rounded tubercular process on the anterior margin of each abdominal segment. These appear to act as a sort of hinge in limiting the movement of the pupa to a lateral one, and are generally metallic in colour, however little the metallic tint may be developed elsewhere on the pupa.

Dehiscence of spines.—Some of the larvæ of *Vanessa io* which I had, died, or were killed when they were almost at the point of pupation. The next day I found that the spines had fallen off, leaving only a scar on the surface of the skin. The spines, therefore, of *Vanessids* are apparently simple epidermal appendages.

Newly-hatched larva of Vanessa urticae.—The newly-hatched larva of *V. urticae*, in spite of the adult being so well spined, is provided with the simplest possible tubercules, each having single hairs of the most approved type common to the newly-hatched larvæ of other groups such as *Pteridæ*, *Satyridæ*, &c.

ERRATA.—Will our readers please cross out the word "entire" (p. 196, line 15,) and write "outer," and also seven lines lower down substitute the name "*Parasa*" for "*Varasa*."

MELANOCYRISM IN BRITISH LEPIDOPTERA.

By MAJOR J. H. STILL, F.E.S.

HAVING read with great interest the various papers on this subject, I incline (from my own observations) to the conclusion that wet and dark places produce dark forms of many species of our lepidoptera. Why this should be so is a problem still to be solved; but it is now generally admitted that many creatures have a power of assimilating themselves to their surroundings, as was proved by the recent experiment at the Marine Biological Museum at Plymouth, of lighting up the under surface of the glass tank in which soles had been placed with the result of a change in colour. The discussion being already in such able hands as those of Messrs. Tutt, Robson and Grote, I only

venture to give my own experience of melanism as I find it in the field.

I have spent several months during each of the last six summers in collecting on and around that great mass of peat and granite known as Dartmoor. There in the midst of hills, intersected by densely wooded and well watered valleys, with a great rainfall and little sunshine, we have, seemingly, every essential condition for the production of melanic forms.

Now, take the two great natural divisions, the hills running up to 2000 feet, and the wooded valleys between them. In the second of these divisions—the wooded valleys—although some species are found that show no signs of variation, others, such as the *Satyridae*, show very great divergence from the type, for instance, *Pararge ægeria* in the open country is of the ordinary type-form, but directly you descend to the valleys the specimens become visibly darker, and the darkest I took was beaten out of an alder-swamp where no sun could penetrate. The same may be said of *P. megæra*. Other species seem to develop spots and rings such as *Epiniphele tithonus* and *E. hyperanthus*. This tendency to variation occurring in one family, but not extending to all, inclines me to support the idea “that wet and dark places act only upon a species having a latent tendency to melanism.” Then again the specimens from low-lying situations of *Polyommatus phloxæ* are darker than those from the open moor, indeed, I have taken this year (in spite of the great drought) almost black specimens, with no red showing at all on the hind wings. Two moths (which I may call ground-resting insects) are always dark on the moor itself, viz., *Gnophos obscuraria* and *Acidalia marginepunctata*, while *Tephrosia bimaculata*, an insect taken on trunks of trees, in the darkest situations does not show any tendency towards melanism. Many other instances might be mentioned among other families, and my experience is that while the ordinary type-form of any insect may be taken in dark hollows, the melanic form is never found in the open sunshine. Therefore, absence of light would seem to be a more powerful factor in their production than dampness, though, in order to produce them, both conditions must be combined.—JOHN N. STILL, Bridestowe, Devon.

It appears to be an undoubted fact that some animals have the immediate power of assimilating their colour to their surroundings, but those on which experiments have been made to test this result are much higher in the scale than Insecta; all I believe are Vertebrata, and I do not think any of our insects can respond to their environment in this way, and I am most certainly convinced that when a lepidopterous insect emerges from pupa, its colours are fixed and final. Of course there is sometimes a change due to loss of scales, and even the collector, pure and simple, is awake to this fact if you try to exchange them with him. I do not know that Major Still supposes such a thing possible in lepidoptera, and therefore the above must be simply taken as my own personal disbelief in such a possibility in insects.

I am not at all clear yet as to how we can determine which insects have, and which have not “a latent tendency to melanism,” although Major Still’s suggestion is on the right road. If in a district where melanism is prevalent, certain species persistently refuse to be melanic, there is a strong *prima facie* reason for supposing that such species have

not "a latent tendency to melanism," but before we can assume that to be a fact, we must be careful to satisfy ourselves that the conditions in each case are identical, that the habits, etc. are similar, and that the necessity for melanic variation is equal in each case. Given that they are, and that then a species persistently refuses to be melanic, then I should say that such species had "no latent tendency to melanism," but Nature would avenge this wrong-headedness, and under such conditions the species would become extinct. Nature rarely shows any cast-iron fixity like this, and it's a very good thing for the species too, and I think it probable that every species, so far as it has an inherent power to vary, has also an inherent tendency to melanism.

Major Still's reference to *Polyommatus phlaeas* is rather striking. This is one of those objectionable species which does not care to lend itself to any general theory. It is particularly subject to temperature influences, and strangely enough the brightest specimens come generally from the coldest, and the duskiest specimens from the hottest places. Assuming that the open moor, although higher, has a higher temperature than the low-lying situations, Major Still's experience coincides in general with the variation exhibited in the species in the area of its distribution, from the Arctic Circle almost to the Equator. The fact that this year's specimens are especially dark also agrees with the general principles of variation everywhere observed.

The habits of *Gnophos obscurata* and *Acidalia marginepunctata* are very similar, and the same general result is observed. The habits of *Tephrosia biundularia* are very different. The colour of the two former agrees or responds to the colour of the ground on which they rest, of the last to the trunks of the trees on which it rests. With these data, the problem appears to be within reach of a solution agreeing with the known result.

I fail to follow the reasoning in the last two paragraphs. On the moor, according to Major Still, *G. obscurata* and *A. marginepunctata* "are always dark," but these are fully exposed to light, therefore, light does not prevent their melanic tendencies from becoming obvious. "*Tephrosia biundularia*," Major Still remarks, "is found in the darkest situations," and "does not show any tendency towards melanism." That is, *G. obscurata* and *A. marginepunctata* being exposed to light, are always melanic, and *T. biundularia* shut away from light is never melanic. Therefore, I fail to see how "absence of light would seem to be a more powerful factor in the production of melanic forms than dampness," a conclusion which Major Still strangely reaches from the above facts.

I quite appreciate the principle involved in the last phrase, although I do not agree with its verbal form. To produce melanism, I do not think "both conditions must be combined." At the same time, if in any place both conditions are combined, I quite understand the intensifying force on the environment of such a place. Melanic forms of species like *Agrotis lucerneae*, *Gnophos obscurata*, *Boarmia rhomboidaria*, *Diurnæa fagella*, and many other species occur as distinct races in localities where there is certainly no suspicion of a lack of light or even of direct sunshine. Where the shutting out of light has a distinct influence on the colour of the tree trunks, etc., then we have a condition, which "natural selection" would not be slow in making

felt, in the species affected by such environment.—J. W. TUTT. *July 23rd, 1893.*

Mr. Tutt in his interesting comments on my short paper, p. 198 of the *Entomologist's Record*, speaking of Indian dimorphic butterflies, says, "that moisture can so unsettle, as it were, the normal constitution of the larva that its natural hereditary tendency to produce a certain form is overcome, and another form is produced in its place." I take it that seasonal dimorphism is of yearly occurrence, and the question comes up, whether we are entitled to assume, as Mr. Tutt does, that the "dry" dimorphic form is the "normal" one, produced by the "natural hereditary tendency" of the species. Is it not rather probable that the wet form is the older and therefore "normal" and that the increasing dryness of the seasons has gradually produced the variation? If we connect melanochoism and these other phenomena of variation with the former appearance of the species, the present climatic environment must be closely studied, and some conclusion as to the former climate must be reached. That butterflies maintain their general appearance with a modern survival of their older normal environment is shown by the history of the North American *Oeneis semideia*, which maintains itself on the summit of Mount Washington and whose probable past geological story I have related in my paper entitled: "A Colony of Butterflies," in the *American Journal of Science and Art*.

I think, then, that "wet and dark" conditions may produce a relapse by reversion to an older form of the species, and that there is also a general probability that our butterflies are, as a whole, more brightly coloured and lighter coloured to-day, than they or their ancestors, say in the Carboniferous epoch, or in any Preglacial period, when they were more generally exposed to a damp and dark environment.

In concluding my present slight and tentative series of reflections upon the subject of Melanochoism, I may take occasion to thank Mr. Tutt for giving them a place, as well as to express my sense of the scientific value of his work and of the use and importance of the *Entomologist's Record* in disseminating necessary information and stimulating enquiry in these matters.—A. R. GROTE, M.A. Bremen, Germany.

I was not aware that I considered the "dry season" form the older one, and at least did not mean to assume it to be so, in my remarks. All I wished to suggest was, that in a species with two ordinary and so far normal forms, constant in the time of their occurrence and different in appearance, changed conditions were capable of producing either form contrary to that which would be produced by nature, and thus far, at least, we are able to prove that external conditions are capable of acting on the larvæ and producing variation. I only used the term "normal" as meaning that the dry season form was normal in the dry season, and the wet season form normal in the wet season. I should call the wet season form abnormal, if developed in the dry season and *vice versa*. I agree with Mr. Grote, that in some instances the dark form is probably the older, but not always so. Each case must be considered on its merits.—J. W. TUTT. *July, 1893.*

SCIENTIFIC NOTES & OBSERVATIONS.

AN EXACT OBSERVATION ON THE DURATION OF THE SEVERAL STAGES IN THE LIFE-HISTORY OF *COREMIA UNIDENTARIA*.—On May 7th, an ordinary ♀ laid one egg; on May 18th this hatched, and the larva fed on marigold; on June 14th, the larva spun up in saw-dust; on June 29th, the imago emerged. Duration of stages: egg, 11 days; larva, 28 days; pupa, 15 days.—F. J. BUCKELL, 32, Canonbury Square, N.

ARGYNNIS EUPHROSYNE ATTRACTED BY DEAD FEMALE.—Apropos of your remarks on "*A. euphrosyne* at fault," I saw a male flirting with a female for some time, returning to it again and again, and found, on closer inspection, that the female was dead and dry.—W. W. ESAM, Eagle House, St. Leonards.

STRIDULATION IN *HALIAS PRASINANA*.—The other evening I heard a male *H. prasinana* that was pursuing a female utter a succession of shrill cries, which it continued after being caught in the net. I am told this is not unusual, but thought it might be interesting to some of your readers.—W. W. ESAM. June 22nd, 1893.

TYROGLYPHUS FARINÆ IN NEW ZEALAND.—At the meeting of the Entomological Society of London, held on February 22nd (*Ent. Rec.*, p. 86), Mr. R. W. Lloyd exhibited specimens of *Tyroglyphus farinæ* found in New Zealand wheat. The species is extremely plentiful in the grain-sheds at Ashburton, and has been known here for many years. I have no doubt that the specimens were found in last season's grain, as much of it was seriously damaged by heavy rains while in stock. The warm rains caused the grain to sprout in the stook, and the result proved a considerable loss to many farmers. After much of the inferior wheat had been threshed and bagged, it had a slight tendency to heat and become a little soft. These conditions were very favourable to the development of *Tyroglyphus farinæ*, and many thousands of sacks of grain were, more or less, attacked by this *Acarus*. It is called "wheat mite" by the New Zealand farmers, and it is much more common on inferior than on well-grown and fully ripened wheat: it is, in fact, rarely seen on the latter, excepting when it may have been stored for some time in a damp place. I have ascertained that these minute-insects can be attracted to the surface of the grain by opening the bags and placing pieces of melted fat thereon. I discovered this by baiting an open-bottomed spring mousetrap with beef dripping, and setting it on the exposed wheat to trap mice. Next morning I found great numbers of *Tyroglyphus farinæ* adhering to the bait, and on the second morning they swarmed on it in thousands. It is a noxious insect that could be easily distributed all over the world in a few years, in grain-carrying ships.—W. W. SMITH, Ashburton, N. Z. April, 1893.

NOTES ON THE EARLY STAGES OF *LYCÆNA ARGOLUS*.—I captured a large number of females of *Lycæna argiolus*, which has been unusually abundant at Sutton Park this year, and confined them in a large sleeve with several branches of holly bearing a large crop of buds and flowers. The butterflies laid their ova very sparingly, but I obtained altogether about 20 or 30 eggs. Owing, I suppose, to the holly not being in its natural state (the stems had been cut off the tree and placed in water), all the buds, including those bearing the ova, quickly opened, faded, fell off and got mixed amongst the *débris* at the

bottom, from which it was impossible to sort them—in short, I now have only three larvæ left. The following are a few notes that I have taken of them:—The ova were laid (from April 22nd to 25th) on the under side of the calyx. All were laid singly, and beneath each bud, from four to five eggs being divided amongst each cluster of flowers. In colour, they were very pale green, almost white; in shape, round. When the flowers open, the petals fold entirely over the egg, hiding it altogether from sight. The larvæ hatched from May 2nd to the 6th. It is a short plump, louse-shaped caterpillar, of a dull greyish-green colour, covered with short whitish hairs, head black. Afterwards, with its next skin, the colour becomes much brighter, and is then of an apple-green tint, being exactly the same shade as the young leaves of the holly, on which it feeds. A darker green line runs down the centre of the back, and all hairs appear to have vanished, with the exception of some very short bristles; the head remains black, the legs, green. Upon hatching, the young larvæ commences to feed on the buds and flowers, amongst which it finds itself, but soon climbs on the young tender leaves and shoots, upon which it thrives. It will also feed on ivy leaves, but when both they and holly are to be had, prefers the latter. The larva, when disturbed, has the power of lowering itself by a web. I do not know how or where the ova of the second brood are laid, as only the early one appears to occur here, I presume, on the young shoots of the holly. In the first case, it is very interesting to note how “natural selection” has taught the insect to always lay its eggs on the calyx, for, should it lay them a fraction of an inch higher up, they would be almost certain to be destroyed, as when the buds once open they are very easily blown away by the wind. The larvæ are, of course, very early this year.—A. J. JOHNSON, Romney Villa, Boldmere, Erdington. May 30th, 1893.

PRACTICAL HINTS.

UNDERSIDES OF BUTTERFLIES.—To the collector who wants to make as good a bargain as he can for the insects he catches, I would suggest the advisability of setting a larger proportion of those common *Diurni* which are repeatedly advertised for exchange, so as to show their undersides. I notice in our Exchange baskets that, whilst common and moderately local butterflies are usually returned to their owners, the undersides of the same butterflies nearly always find a ready exchange.—J. W. TUTT.

THE MONTH.—During this month many larvæ may be found, but unless the weather is dull and unfit for day collecting, they had better be left, as they are mostly young and many hybernate for the winter, in which case they are very difficult to rear under artificial conditions.

Many imagines emerge this month, more particularly those belonging to the *Nocturæ*, therefore, the sugaring-tin must be freely used, as by this means many rarities are obtained, that would otherwise be very difficult to get. The flower (?) of the wood rush is also very attractive, exuding, as it does, a kind of honey-dew. The writer has seen a patch of these rushes literally swarming with insects, amongst them being such species as *Noctua neglecta*, *Dyschorista suspecta*, *N. dahlia*, *Aplecta occulta*, &c. The rare *Acronycta alni* has occurred this month at sugar.

Where the flowers are abundant and prove a greater attraction, it is better to "sugar" the flowers when practicable. Carefully examine ragwort flowers for *Agrotis pyrophila* and *Tryphaena subsequa*—both of which are very conspicuous in the rays of the lantern, and are still considered rarities. Light continues very productive.—J. P. Mutch.

NOTES ON COLLECTING, Etc.

FAILURE OF SUGAR.—This season is decidedly mixed. Yesterday, at Dorking, we took *Lycena alsus* in good condition, also *Argynnis paphia*, and most of the July things are out, although a few are rather more backward than usual. Sugar is a dead failure. A night last week at Hale End, only produced one *Triphaena pronuba*, and two *Miana strigilis* from about forty trees, although *Noctua festiva*, *N. rubi*, and *N. triangulum*, &c., were flying freely. At the same place, this time last year, there were about fifty insects on every tree. Would not this be a good opportunity of discussing the question of the failure of sugar during certain seasons? I know the usual reason quoted is the abundance of honeydew, but I am a sceptic on that point.—1st, supposing that the attractive powers of honeydew are ten times those of sugar, surely even that would not suffice to draw away all but three out of say three thousand specimens (the computed number for the same time last year); 2nd, honeydew is easily washed off by rain, and one good wet day ought to make sugar pay, but in my experience it does not; 3rd, has anyone ever seen NOCTUÆ in the countless swarms at honeydew that one might expect if it were so specially attractive; 4th, when sugar pays, insects will be there; or, if no sugar is put on, they visit flowers, &c. At seasons like this they "loaf" up and down the hedges aimlessly. One sees many more NOCTUÆ "loafing" this season than in good years. My own idea on the subject is, that it is owing to a constitutional change in the insects, which causes them to almost abstain from food. As to how the change is brought about I fail to see, except that it has an evident connection with a spell of hot, dry weather.—A. U. BATTLEY. *June 16th, 1893.*

With regard to No. 1 of Mr. Battley's arguments he seems to me to be all at sea. He forgets the comparative *area* of the treacle and honeydew. If they are *equally* attractive, and the area of honeydew leaves : the area of treacle :: 3,000 : 3, his proportion is accounted for. This may well be when every leaf seems sticky, as was the case this year.—A. ROBINSON, 1, Mitre Court Buildings, Temple. *June 12th, 1893.*

I HAVE not been very successful with sugar, but I think the state of all the leaves, thick with honeydew, easily accounts for their not requiring artificial food.—E. BAZETT, Springfield, Reading. *June 9th, 1893.*

THE "loafing" NOCTUÆ have been remarked here this season, but probably if caught they would turn out common hedgeside species. I think NOCTUÆ could not be expected in such numbers at honeydew as at sugar from the simple reason that the former is more diffused, and the insects spread over a greater radius. Here, sugar is useless this season. Aphides are in numbers even upon the grass.—S. WEBB, Dover. *June 10th, 1893.*

I THINK that the honeydew accounts for the failure of sugar. I have done absolutely nothing in the woods, though there were swarms of NOCTUÆ about, but on the top of the downs, on palings, I have found insects come very freely.—There were a few *Agrotis cinerea*, but *A. exclamatoria*, *A. segetum*, *Leucania pallens*, *L. comma*, *A. corticea*, *Miana strigilis*, *M. fasciuncula* and *Apamea basilinea* were in swarms, with a few *Aplecta advena*. But as all my best insects are woodland, I have had a desperately bad season. If it had not been for my larvæ I should have been nowhere. I did some grass sweeping in the spring-time, and have bred some thirty *Leucania impura*, one *Apamea oculea*, one *Triphæna interjecta* and one *A. gemina*—not a very varied bag so far.—G. M. A. HEWETT, Winchester. June 26th, 1893.

WITH regard to the failure at sugar, we seem to know as yet very little. In 1892, a continuously fine May and early June produced heaps of moths. Hundreds came to almost every patch, and this was wonderfully general. With a still finer May and June this year, insects would not come and no enticement seemed to fetch them. Therefore, the fine weather could hardly be answerable for the difference, as both years were almost equally fine. This year vegetation was marvellously early, last year it was much later, and during May and June there were fewer flowers and other naturally attractive baits. The moon, too, was bright during both periods, but last year one correspondent wrote:—"The moon nor anything else seems to prevent them"; and many of the most successful sugaring nights were bright with moonlight. But bright days, with a scarcely perceptible east wind, which, however, produced extreme radiation at night, did stop moths coming to sugar throughout July and part of August, 1892, and we have had a considerable number of similar days and nights during the current spell of abnormally brilliant weather. This, then, may account in part. But that flowers and honeydew are chiefly responsible for the difference between the two years is as yet my present opinion. Everywhere in June the place was surfeited with the latter, even the grass on our London railway banks, and the area, compared with the small districts we sugar, must be immense. Another point that makes me feel that "honeydew" is largely responsible, is that those localities most destitute of flowers and herbage are always the most uniformly profitable for sugar. Coast downs and sand hills are proverbially prolific in their production of large numbers of species and specimens at the artificial "sweets," and these places are particularly devoid of natural attractions until the rushes and sedges blossom, and then NOCTUÆ sometimes swarm at them. A bright day, with no perceptible breeze until the sun goes down, and then a slight haze from the ditches, rising and curling and spreading over the banks, informs you that what little breeze there is, is easterly, and you may as well pack up your traps at once and go home, even in the best places. I have oftentimes at Deal left friends on such nights to work in their wretchedness, whilst I have gone as quickly as possible to the high ground to "dusk," and then made my way home. Sugar will not pay anywhere on such nights, the moths will not stay to feed. But there are nights when countless thousands come—literally thousands, when they jostle each other for a place on flowers and sugar; on such nights you stand still while the perspiration runs down your back in streams, but there is no east wind then, no radiation, and, probably, no honeydew, but to what attractions

there are the moths come, and feed, and guzzle, as if guzzling and feeding were the only end of their creation. And there are nights when the wind howls, when the rain falls in torrents and runs out of your boots as fast as it pours down your neck, when waterproofs and gaiters get saturated, when you can't hear your companion bellowing into your ear at any distance beyond six inches, and when moths with gleaming eyes fight for treacle and rum in perfect harmony with the warring of the elements. My boy and I had such a night on Deal sand-hills once, and I have had one or two others there alone. I would go again to-night for such another.

Now, ye wise ones, who make theories for us collectors who have perspiration trickling down our backs and catch lots of moths, and who have the rain trickling down our backs and also catch lots of moths, how do you explain the connection between the "the trickling down our backs" and "lots of moths." There's no honeydew on the rain-trickling nights, I'll answer for, and, therefore, they are perfectly free to come, but there may be on the perspiration trickling nights. However, I am of opinion that, as a rule, the greater the influence of natural attractions, the less the influence of artificial ones. What have our wiseacres to say on the matter?—J. W. TUTT. *July, 1893.*

PLUSIA MONETA AT DORKING.—In addition to the specimen captured last month by my friend Mr. Flood, I was fortunate enough to take one about the same time, attracted to light, but which, through subsequent carelessness, effected its escape. Mr. Flood informs me that this rare species has been taken here each year since 1890. In this connection it may be interesting to know that I captured two specimens of *P. moneta* in Kent as far back as 1857, which, until I saw Mr. Flood's capture, remained amongst unnamed insects. This fact points to the suggestion that this species has, on former occasions, unsuccessfully endeavoured to establish itself in this country, as it could not have remained unnoticed during so many years. May it have better success in its present attempt!—THOS. W. KING, Purbrook, Dorking.

PLUSIA MONETA AT STROOD.—I captured a specimen of *Plusia moneta* here last night. I took great care not to let this specimen escape, as did the one at Dorking.—T. W. KING, The Vicarage, Strood, Kent. *July 11th, 1893.*

NOTES OF THE SEASON.

Late spring and early summer in North Kent.—To anyone with limited time, and whose collecting is done with a view of getting fresh air in the country, after being cooped up in close rooms for a week, this season has been remarkable. This is my position, and since my one day out per week (Saturday) is fixed by inevitable laws for me, I must own the weather has this year, up to date, been remarkably propitious. Not till Saturday last (July 15th) did I spend one indoors, or without my net, and then, had I put my trust in the weather itself instead of submitting to my own judgment, I should have scored better, for the wretchedly dull day in London was fine enough in my usual haunts in Kent. I have done all my collecting this year in North Kent, and in a very restricted space, and, on the whole, have not been disappointed in the number of specimens captured, although I have only visited two localities—one a wood, the other, the chalk hills in the neighbourhood of Rochester. In most of the expeditions I have been accompanied

by my young and ardent friend, Mr. Page, and unless Nature exerts a strong recuperative effort, I am afraid the localities will suffer from the effect of our combined energies.

Our first visit for collecting was on April 29th, to the well-known woods near Cliffe, in Kent. *Argynnis euphrosyne* was in such numbers as I have never before seen it in these woods during the last 22 years. There were but few in the rides, but in the recently cut parts of the wood they were in the greatest abundance. *Asychna modestella* was abundant in the sun, dipping its head deep into the nectaries of the flowers of *Stellaria holostea*, or flitting about the same plant laying its eggs. *Stigmonota perlepidana* was in great abundance, and in lovely condition, among the purple vetch, and the males of *Psyche pulla* swarmed in a field just beyond the wood. Very few "cases," however, were to be seen on the grass. *Lomaspilis marginata* and *Strenia clathrata* were already out, together with swarms of *Gracilaria alchemiella* and *Heliozele sericiella*, as well as an odd specimen or two each of *Tischeria marginea*, *Grapholitha obtusana*, *Catoptria albersana* and a considerable number of *Eupæcilia maculosana*, *Cnephasia musculana*, *Syrichthus malvæ* and various species of *Lithocolletis*. On May 6th, a journey was made to the chalk hills. *Nisionades tages* was in swarms and in the loveliest condition; *Lycæna bellargus*, a considerable number of males; *L. agestis*, *L. icarus*, *Argynnis euphrosyne*, *Pieris napi*, *P. rapæ* and *Cœonympha pamphilus* were all fairly common, whilst a fine series of *Thecla rubi*, chiefly resting on or flying round the beeches, and a single *Euchloë cardamines* were captured. *Euclidia mi* and *E. glyphica* flew fairly commonly with *Syrichthus malvæ* among the long grass, where also *Crambus pratellus* was abundant, and *Phytometra ænea* occasionally appeared. An odd specimen of *Eupithecia centaureata*, much worn, a few *Ematurga atomaria*, *Corycia temerata* and *Coremia ferrugata* were observed; whilst in the woods lots of *Nemophora schwarziella*, together with *Eupæcilia maculosana* were seen, the latter among the bluebells. Among the birches *Phlæodes tetraquetra* was common, and a solitary *Phoxopteryx derasana* was beaten from buckthorn. *Pancalia leuwenhoeckella* was very abundant among the violets on the chalk banks, and burdock was riddled by the larvæ of *Acipitilia galactodactyla*, which were feeding, or already had pupated, whilst the nettle beds swarmed with larvæ of *Vanessa urticæ*. May 13th was spent in the woods; *Corycia taminata*, *Acidalia remutata*, *Asthena candida* were all very abundant, whilst in a grassy meadow *Psyche pulla* swarmed. *Nisionades tages* was abundant in one drive, but *Syrichthus malvæ* and *Argynnis euphrosyne* were decidedly past; *Euchloë cardamines* and *Lasiommata megæra* were occasionally to be met with, but I have rarely known these species so rare in North Kent as they were this year. *Ephyra micronaria* occurred occasionally among the maple, and *E. porata* and *Cidaria corylata* among the oak. *Euclidia mi* and *glyphica* were in lovely condition in the field where *P. pulla* was so abundant, with an occasional *L. medon* and *Sirenia clathrata*. A few fine *Lomaspilis marginata* and *Melanthia ocellata*, with one *Eurymene dolobraria*, were beaten out; *Eupithecia plumbeolata* occurred among *Melampyrum pratense*. All the TORTRICES taken on April 29th were met with, whilst *Tortrix ministrana*, *Phoxopteryx mitterpacheriana*, *P. diminutana*, *Dichrorampha acuminatana*, *Ephippiphora cirsiana*, *Lobesia reliquana*, *Sciaphila hybridana* and *Coccyx splendidulana* put in an appearance, as well as *Glyphypteryx forsterella*.

and *Hesperia sylvanus*, a very early date for a first appearance. At Cuxton, on May 20th, *Lycena bellargus* was in great numbers. The day was showery and windy, with scarcely any sun, but careful searching gave a splendid lot of females, some brilliantly tinted with the male coloration, and with varying depths of intensity and size in the orange-red spots bordering the wings, but the best catches were a female with the left side of a whitish colour due to the pigment being undeveloped, and an undoubted natural ♂ hybrid between *bellargus* and *corydon*. The shape and general character of the latter is that of *corydon*, the colour not quite so brilliant, but falling very short of that of *bellargus*. *Euclidia glyphica*, *E. mi*, *Lycena medon*, and *Scoparia dubitalis* were not uncommon. Odd specimens of *Nemeophila plantaginis* and *Acidalia ornata* were disturbed, whilst about ten minutes "beating" produced two *Phoxopteryx derasana*, *Emmelesia albulata*, *Botrys pandalis*, *Eupithecia subumbrata*, *Lobesia reliquana*, *Nemophora schwarziella*, *Corycia laminata*, *C. temerata* and a few other common species. *Psyche palla* was common, as also was *Cænonympha pamphilus*, but only one *Euchloë cardamines* was seen. A heavy storm, about 4 p.m., drove us to the railway station, much to our disgust, as there is no doubt two or three hours' beating would have much increased our day's "bag." On May 22nd I was again in the woods. Larvæ of *V. urticae* were in all stages of growth, pupæ and both fresh and hibernated imagines were also found. *Corycia laminata* was in great abundance, as also were *Acidalia remutata*, *Cidaria corylata*, *Pechipogon barbialis*, *Strenia clathrata* and *Asthena candidata*. Less abundant were *Corycia temerata*, *Melanthia ocellata*, *Melanippe sociata* and *Cidaria russata*, but *Ephyra porata*, *E. omicronaria* and *Iodis lactearia* had to be much overhauled for good specimens, only five full-coloured specimens of the latter being captured. *Numeria pulveraria* was worn, one *Eurymene dolobraria* and one *Tephrosia luridata* were beaten out, and I saw the first *Aspilates strigillaria*. How pale our woodland form is compared with those from the moors either in the North or South? A few beautifully fresh *Hesperia sylvanus* and *Syrichthys malæ* were captured, *Euclidia mi* and a few *Heliaca arbuti* were taken flying in the sunshine with a single *Pyrausta purpuralis*, the wood form of this species is rather different to that from the chalk. *Eupithecia plumbeolata* was common but getting worn, *Emmelesia albulata* just coming out, as also was *Asthena luteata* among the maple, whilst two fine *Lithosia aureola* were welcome. *Euclidia glyphica* was flying high round the oaks, a strange habit for this species it appeared to me. I only saw one *Venilia maculata*, a species generally very abundant here. Three *Selenia lunaria* were beaten out, all cocks of course because I wanted a hen for eggs. A second brood of *Lasiommata ægeria* had begun to emerge, *Euchloë cardamines* ♀ (the only female this year), *L. megæra*, *C. pamphilus*, *L. medon* and one freshly emerged *Argynnis euphrosyne* being the only Diurni besides the three common Pierids. *Procris statice* was very rare, and I saw but one *Nemeophila plantaginis*. A specimen of *Phlogophora meticulosa* was knocked out. Of the TORTRICES, *Dichro-rampha sequana*, *D. plumbana*, *D. plumbagana*, *A. æneana*, *Catoptriu hypericana*, *P. lecheana*, *Penthina pruniana*, *Ephippiphora nigricostana*, *E. trigeminana*, *Stigmonota roseticolana*, *S. germarana* and *S. internana* put in a first appearance, some commonly, others only singly, whilst several species of *Elachistidæ* were abundant. This latter fact drew

me to the same neighbourhood on May 27th, and I was fairly fortunate in my captures of the small fry. Among the larger species *Scoria dealbata* occurred, whilst *Zanclognatha grisealis* was well out. *E. albulata* was rather rare, *C. taminata* and *C. corylata* very mixed, some fine as ever, some worn to shreds; *E. porata* rather worn; *C. taminata*, *Ligdia adustata*, *Melanthia ocellata*, *Asthenia luteata* in fine order, the first fairly abundant; whilst *Eupithecia exigua*, a lot of *Pechipogon barbalis*, one *Drepana falcula*, *E. decolorata*, three *Lithosia aureola*, one *Acidalia subsericeata*, *Coremia unidentaria* and others fell to the beating stick. *Cidaria russata* and *Ephyra omicronaria* were common, but scarcely a specimen was worth boxing. *Euclidia glyphica* was getting well over, but I took one with the two transverse lines united into a strong central band. *Procris statice* was worn to shreds already; *Aspilates strigillaria* also. The fine weather had kept them almost constantly on the wing, and this probably helped matters. I got a fair number of *TORTRICES*, in fact I had quite a field day with *Phoxopteryx diminutana*, which occurred freely in almost every fallow bush. *Argyrolepis aeneana* still remained rare among the ragwort, and I got a single *Lobesia servillana* about sloe and one *Semasia weberana* among crab-apple. I remember someone (Mr. Gregson, I believe) suggesting that this was an imported species, but it must have been imported a good many years ago into these woods, probably at the time we got our present fauna after the glacial epoch. I get the species every year, and I daresay it would be common enough if I stayed of an evening, to work for it at dusk. *Nemophora metaxella* and *Cryptoblades bistriga* were also netted, the latter from oak. *Strenia clathrata* and *M. montanata*, *Lobesia reliquana*, and *Phoxopteryx obtusana* were particularly abundant, as also was the second brood of *L. aegeria*.

On June 3rd *Scoria dealbata* was fairly common, and I took a fine series of *Emmelesia albulata* and *A. luteata*, together with a few good specimens each of *Z. grisealis*, *Eupithecia castigata*, *E. plumbeolata*, *S. clathrata*, *L. marginata* and *I. lactearia*. A fine freshly emerged *S. malva* was also taken, whilst good specimens of *P. barbalis*, *E. omicronaria*, *C. corylata* and *E. glyphica* were to be got by selection. *Corycia taminata* was still common, whilst fine single specimens of *Ephyra punctaria*, *E. porata*, *L. aureola*, *Erastria fuscata*, and *M. sociata* were captured. The place was alive here and there with *Argyrotoxana conwayana*, whilst *P. pruniana*, *Ptycholoma lecheana*, *Tortrix ministrana* and *Scoparia ambigua* were also abundant. *C. bistriga* again occurred, as also *S. weberana*, whilst *P. corticana*, *Endopisa nigricana* were captured, and *P. mitterpacheriana* and *P. diminutana* still occurred. Half a dozen *A. aeneana* represented the largest catch I made of this species in one day during the season. *Eucosmia undulata*, *Angerona prunaria* and *Drepana falcula* fell to the beating stick, whilst *L. aegeria* occurred commonly in one ride only. *Aspilates strigillaria* and *Eubolia palumbaria* were both getting worn, whilst *H. sylvanus* was still in abundance everywhere. The best catch of the day, however, was a single specimen of *Argynnis selene*, caught in a locality which has been worked closely for the last 50 years, and where the species has never been seen before. A good supply of *TINEINA* helped to complete the day's total.

On June 7th, in the same locality, the males of *Bombyx rubi* were in great abundance, dashing wildly about in every direction. *Scoria dealbata* was practically over; *L. aegeria* more abundant than ever;

Euthemonia russula just appearing; whilst on this date I saw my last *E. cardamines*, a male; *Epinephele janira* was already common, and *Hesperia sylvanus* swarmed, and was in dozens everywhere. *Euclidia glyphica* began to get common again, and *Eubolia palumbaria* and *Aspilates strigillaria* were moderately abundant. *C. corylata* and *L. aureola* made their exit this week, as also did *Corycia temerata*, but *C. taminata* lasted out another week yet. A few brilliantly tinted *Iodis lactearia* were taken, and about seven in the evening I captured the finest series of *Asthenes luteata* it has ever been my lot to fall across. *Tortrix sorbiana*, *Penthina sellana*, *Stigmonota nitidana* and *Spilodes cinctalis* made a first appearance, and I got another specimen or two of *C. bistriga*, but the Tortices appeared to be on the wane, although the *Elachistides* were fairly abundant. *Angerona prunaria* again put in an appearance. The next Saturday, June 10th, *L. ægeria* was very abundant as also was *Eubolia palumbaria*, and *Euthemonia russula* males occasionally occurred. *Nemeophila plantaginis* and a few female *Scoria dealbata* turned up, as also another *Angerona prunaria*; *Erastria fuscula*, two or three beaten out; another *Spilodes cinctalis*, and a fine *Syrichthus malva*. *Euclidia glyphica* was very worn, a few only being fine of a large number netted. *H. sylvanus* was getting over, as well it might being constantly on the wing. *Zygæna lonicera* was hanging in lovely condition on the vetch blossoms. *P. lecheana* swarmed round the oaks. *E. punctaria*, worn, was knocked out of the oaks; I saw only one good specimen this year. *P. barbalis* made a last appearance, as well as *A. subsericeata*. This latter would have been abundant enough had I stayed to "dusk," but I did not, and got back to London as soon as I could. A few *Asthenes luteata* only appeared where I took a good number the previous visit. *Eupithecia satyrata* occurred sparingly, and I was very pleased to capture two specimens of *Ebulea stachydalis*, the first time I ever met with the species alive. I got two more beautifully tinted *Iodis lactearia*, and a few very fine *A. cæneana*. *Psyche pulla* was still out, and small fry still abundant, but they were chiefly of the species I had met with before.

This brings me to the end of the early part of the season, and the species we get about midsummer in ordinary years. At the beginning of June, it will be seen, insects were still about two weeks in advance. The most striking feature about many species this year is the way they have lasted out, some being in good condition for five or six weeks, which are usually over in a fortnight. On the other hand many other species—butterflies and active day-flying moths particularly—have been quickly over and disappeared, some to produce a second brood in a very short time. These second broods began to appear rapidly after the beginning of June, and I have ended here just before their appearance.

For a series of holiday Saturdays, where work did not begin till noon and ended, on the average, at 6 p.m., and where not a single night's work is included, I think the above list shows a fairly satisfactory state of affairs in North Kent.—J. W. TURR. *July, 1893.*

York and Scarborough.—There is every indication of a good collecting year, and thus far I have made one or two good "bags." The dry weather has had the effect of allowing us to wander freely over one of the best grounds near this city, viz. Askham Bog, it being perfectly dry and safe. With a continuance of the present weather conditions,

I hope to make up a little of the lost time of last summer—the worst I ever remember. Everybody is recording early dates of appearance, and they are very numerous here as elsewhere. I took a short series of *Asthenia blomeri* yesterday (the 5th), last year it was some three weeks later at the same place, I am told, and the year before plenty of examples (rather worn) were captured as late as the August Bank Holiday. Last week I took six species of the genus *Acronycta*, including *leporina* (2), and also six species of the genus *Hadena*, viz. *adusta*, *dentata*, *suasa*, *oleracea*, *pisi* and *thalassina*. *P. lignata* was flitting about in fair numbers, and I came across a few *Collix sparsata*, evidently newly out. On Whit Monday (May 22nd), I was in Scarborough, and had a look for *Sciaphila octomaculana* on the Castle Wall, but I found I was too early. I turned up, however, at Hayburn Wyke (a few miles north of Scarborough on the coast) *Lobophora viretata* and *Venusia cambricaria*, both in fine condition.—S. WALKER. June 6th, 1893.

Reading.—*Stauropus fagi* has been by no means so plentiful as last year. I have been out four or five times and have only taken one; but I have been very fortunate with *Melanippe hastata*, *Eupithecia plumbeolata* and many others. I have taken *Limacodes testudo* (1), *Hadena adusta*, *Aplecta tincta*, *A. nebulosa*, *Hypsipetes impluviata*, *Erastria fuscata*, *P. barbalis*, *Eurymene dolobraria*, *Epione advenaria*, *Asthenia candidata*, *Ephyra trilinearia* (swarms), *E. pendularia* and a great number of Micros.—E. BAZETT. June 7th, 1893.

Cambridge.—The season here, as everywhere, is unusually early. June species were out early in May and even in April, but although early, most things seem very scarce; to this there are notable exceptions. Among the Macros I saw *Papilio machaon* on April 23rd, nearly a month early. *Macrogaster arundinis*, however, astonished me more. I have not been able to work for them myself, but saw living specimens taken on May 14th. Although they are usually to be taken just after the middle of June, the surest time is the end of that month and first week of July. My best nights for the species were those of July 3rd and 6th, 1891, in splendid condition. I collected full-fed larvæ of *Gelechia morosa* on May 14th, the moths emerged June 16th, just three days earlier than I found larvæ in 1890 and 1891; the moths in those years emerging about July 22nd. I have bred a beautiful series of *Spilosoma lubricipeda* var. *radiata* this year, thanks to Mr. Harrison, and am now breeding *Geometra vernaria*, the descendants of a ♀ caught in 1889. They do not show the least sign of deterioration in colour or otherwise, which might have been expected from four years interbreeding. I have done but little collecting yet, but have taken several nice species of Micros, a list of which I must give later. As a curious coincidence with Mr. Atmore's experience (and a most deplorable one), the two or three alder trees from which I took *Stathmopoda pedella* two years ago have been cut down; there are others about the place, but *pedella* seems very local, and it was only these two or three condemned trees that yielded the species.—W. FARREN. June 20th, 1893.

Morpeth.—I caught *Cidaria silaceata* this season on May 17th, and I am looking forward with the hope of taking it again in August this year, as I notice that some of the larvæ are already more than half their usual size. Insects are all much earlier this season, but I have

seen them more plentiful. There is no doubt but that the three last dull seasons which we have had in this neighbourhood, have had a great deal to do with the scarcity of insects during the present season, and I cannot say that I have found a single species really plentiful as yet this season.—J. FINLAY, Morpeth. July 6th, 1893.

Morayshire, Aberdeen and Braemar.—I sugared on the sand-hills at Burghead, Morayshire, on the 6th inst., and was successful in taking a pair of *Triphæna subsequa*. *Xylophasia polyodon* was, as usual, abundant, and dark and black vars. were common. *Agrotis valligera* turned up in fair numbers, also a few *A. corticea*, *Noctua festiva*, *Agrotis porphyrea*, *T. pronuba*, *Caradrina blanda*, *Apamea oclea* and one black variety of *T. orbona*. *Crambus dumetellus*, *C. perlellus* and var. *warringtonellus* were numerous among the bent grass on the sand-hills at Aberdeen on the 7th inst., but only *Xylophasia polyodon* and *Miana fasciculata* came to sugar, although many Noctuidæ were to be seen on the wing. On the banks of a small stream I netted about forty *Coremia munitata* and a few *Plusia pulchrina*, *Chortodes arcuosa* and *Platyptilia bertrami*. I spent a week at Braemar with my friend, Mr. Reid, when we were fairly successful with *Zygæna exulans* and some other Alpine species.—A. HORNE, Aberdeen. July 10th, 1893.

North Devon.—The season is continuing pretty much as last month, i.e., everything about a month in advance. The following are my additional "First Notices":—*Rhopalocera*.—June 8th, *Thecla quercus*; 9th, *Vanessa urticæ* (fresh hatched), *atalanta* (ditto); 12th, *Argynnis aglaia*, *Hesperia linea*, *Epinephele hyperanthus*; 15th, *Thecla rubi* (worn), had been out about a month, but that would be their normal time), *Satyrus semele*; 22nd, *Arge galatea*, *Argynnis paphia*; 25th, *Epinephele tithonus*; 27th, *Colias edusa*. Of the last species, two specimens have been seen, but none caught. They certainly are, so far, in no abundance like last year; but in 1892 no fresh specimens were seen till the very end of July, and they were not plentiful till the beginning of August. Light has again proved very attractive till stopped by the moon. The following are the additional species taken since the notice for the June Record was sent:—June 2nd, *Caradrina alsines*; 6th, *Cidaria fulvata*, *Boarmia repandata*; 8th, *Euplexia lucipara*, *Acronycta megacephala*, *Leucania lithargyria*, *Hemithea thymiaris*, *Cleora lichenaria*, *Acidalia imitaria*; 13th, *Lophopteryx camelina*, *Agrotis corticea*, *Caradrina cubicularis*, *Leucania impura*, *conigera*, *Chariclea marginata* (umbra), *Boarmia rhomboidaria*, *Selenia illunaria*, *Cidaria pyraliata*, *Ellopiia fasciaria*; 15th, *Cherocampa elpenor*.

Sugar whenever tried still produces nothing.—(Miss) K. M. HINCHLIFF, Worlington House, Instow, N. Devon. July 3rd, 1893.

Wicken.—Last week and this week I have had four nights collecting here. I say advisedly nights as there is practically nothing to be done in the day-time, except to take *Papilio machaon*, the second brood of which is coming out. Netting at dusk was not very profitable. *Collix sparsata*, *Epione apiciaria*, *Lobophora sexalisata*, and *Cidaria testata* are the principal Geometers at that time, all rather worn except *sexalisata* which is strangely fresh, as I know that larvæ of that species, very small of course, are now being taken in the New Forest. Light is, and has been, according to Mr. Houghton, all through the season a total failure, even the common Bombyces not putting in an appearance. A few *Nudaria senex*, *Pelurga comitata* are all we have taken, but

sugar answers very well. I have taken a long series of *Helotropha fibrosa* beautifully varied both in colour and markings, and in very good condition. *Calamia phragmitidis* has only been sparingly taken. *Tapinostola hellmanni* is hardly out at all yet. *Leucania pudorina* is getting worn, whilst *L. pallens*, *L. impura*, *Xylophasia polyodon*, *Apamea oculea* and *Hadena oleracea* are pests. One *Agrotis ravida* has fallen to my lot, and of others, *Noctua rubi*, *N. baia*, *Cerigo cytherea*, *Cuspidia megacephala*, *Caradrina alsines*, *C. morpheus* and *Cosmia affinis* are the best.—J. C. MOBERLY, Wicken. July 13th, 1893.

SOCIETIES.

SOUTH LONDON ENTOMOLOGICAL SOCIETY.—July 13th, 1893.—Mr. E. Oldham exhibited specimens of *Macaria liturata*, Clerok, *Melanthia albicillata*, L. and many others, some fine forms of *Odonestis potatoaria*, and a specimen of *Plusia moneta*, captured at Woodford on the 2nd June, Mr. Adkin remarking that this species appeared to be distributing itself gradually over the country. Mr. South showed a remarkable form of *Triphena pronuba*, L., it being the typical *pronuba* on one side and the variety *innuba*, Tr. on the other, also *Coccyx ochsenheimeriana*, Zell. and a variable series of *C. tædella* from Middlesex. Mr. Fenn exhibited long bred series of *Dicranura bifida*, Hb., *Boarmia roboraria* Schiff. and *Notodonta dictæa*, L. from Bexley, the New Forest and Deal, respectively. Messrs. Adkin, South, Frohawk and Briggs showed very long series of *Pieris brassicae*, L., from many parts of England, Scotland and the Isle of Man, &c., for the purpose of showing the variation existing, both in size and markings, Mr. Adkin drawing attention to the manner in which the depth of colour in the tips varied from black to dove grey. One shown by Mr. South was no larger than an average *Pieris rapæ*, L. Mr. Frohawk's specimens comprised, amongst others, a number from Harwich. These corresponded to the Southern French type, and had no doubt immigrated. Mr. H. Moore showed three specimens of the Harlequin Beetle, *Acrocynus longimanus*, from Trinidad, &c. Mr. Auld, a fine var. of *Lomaspilis marginata*, L. from Folkestone. Mr. Step, a number of pupæ of the "bacon beetle," *Dermestes lardarius*, which he stated were being experimentally tried as bait for fishing when in the larval condition. Mr. Barrett mentioned a curious instance in which a number of lepidopterous larvæ had been found in earthen cells in a book drawer, and were supposed to have been placed there by one of the fossorial Hymenoptera (? Ed.). Mr. West of Streatham, showed *Sesia bembeciformis*, D.L. Mr. Turner two varieties of *Argynnis selene*, Schiff. and a number of TORTRICES and TINEINA, including *Penthina pruniana*, Hb., *Sciaphila subjectana*, Gn., *S. hybridana*, Hb., *Tortrix ministrana*, L., *Phoxopteryx mitterpacheriana*, Schiff., *Nemophora swammerdamella*, L., &c. Mr. Briggs also exhibited a portion of the outer covering of a tree wasp's nest, which was curiously striped with blue, the insect having, no doubt, been using blue paper or other material of that colour in its formation.—H. WILLIAMS, Hon. Secretary.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—Tuesday, July 4th, 1893.—Exhibits:—Mr. Gates, cases and bred

imagines of *Psyche radiella*, *Coleophora lineola*, *C. nigricella* and *C. saturatella*, also examples of *Stigmonota internana* and *Pterophorus pentadactyla*. Mr. Clark, two specimens of *Smerinthus tilix*, showing the extremes of the pink and green forms, both bred from the same batch of eggs. Mr. Tremayne, bred specimens of *Vanessa polychloros* and *Thera variata*, including a dwarf specimen of the latter. Mr. Battley, living larvæ of *Timandra amatoria*. Mr. Oldham, a specimen of *Plusia moneta* taken at Woodford, and *Abraxas ulmata* from Epping Forest. Mr. Smith, *Halias quercana*, *Angerona prunaria*, and *Pericallia syringaria*, all from Epping Forest. Dr. Sequeira, *Papilio machaon* and larvæ of same, also bred specimens of *Vanessa io*. Coleoptera :—Mr. Heasler, *Magdalinus barbicornis*, *Cryptocephalus frontalis*, and *Tillus elongatus* ♂, all from Sudbury, Middlesex. Mr. Burrows, a female specimen of *Tillus elongatus* from Billericay.

Dr. Buckell then brought forward the rough draft of the list of London Lepidoptera. The list of Rhopalocera was gone through, and several additions made, and a vote of thanks to Dr. Buckell concluded the proceedings.

July 18th, 1893.—Mr. B. G. Morris, of 18, Woburn Place, W.C., was elected a member of the Society. Dr. Buckell made two interesting additions to the Society's library, viz. the 1829 edition of Stephens' *Nomenclature of British Insects*, and a copy of the English edition of Cuvier's *Animal Kingdom*, the part of which relating to the Insecta was by Latreille, and embodies his latest ideas of classification.

Exhibits :—Dr. Buckell, a batch of ova of *Eugonia quercinaria*; he also exhibited a batch of ova of *Melanippe fluctuata*, as being in many respects typical of *Geometrid* ova, viz. of an oval shape, and scattered in deposition. The ova of *E. quercinaria*, on the contrary, were cylindrical, tapering slightly both at base and apex, and were slightly indented at the latter extremity: they were, moreover, deposited in large batches, the ova slightly overlapping one another. Mr. Morris: an example of *Melanargia galatea*, from Swanage, having the white marginal spots on all four wings extremely indistinct; also *Amphidasys betularia*, var. *doubledayaria*, from Scarboro', and a ♀ example of *Argynnis paphia* tending towards the var. *valezina*, or, in other words, a female, not quite so highly specialized as usual. Mr. Dewey: examples of *Diphthera orion*, and an hermaphrodite specimen of *Lycæna icarus*, from Eastbourne; also a preserved larva of *Tæniocampa miniosa*. Mr. Riches: two ♂ examples of *Stauropus fagi*, from Epping Forest, one of them being an example of the dark variety; he stated that both these specimens had been taken from young trees. Mr. Lane: series of *Smerinthus ocellatus* and *S. tilix*, from N. London. Mr. Heasler: a specimen of *Calamia phragmitidis*, bred from a pupa found on the Barking marshes; also examples of *Harpalus rotundicollis*, from the same locality. He stated that the occurrence of this species at Barking was strange, the locality given by Fowler being the Isle of Wight. Mr. Riches announced that he had bred during the season a series of *Smerinthus ocellatus*, which had spent two winters in the pupa. Dr. Buckell then read the records of "Sphingidæ" that he had received for the Society's London Fauna List, to which the members present made many interesting additions.—A. U. BATTLEY and J. A. SIMES, *Hon. Secretaries*.

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An Explanatory Suggestion of the Plumose Antennæ in the Female Lepidopterous Pupa.

By J. H. WOOD, M.B., F.E.S.

THOSE of us into whose hands Mr. Poulton's beautifully illustrated paper on the Lepidopterous pupa has fallen, must have felt greatly indebted to him for opening a little-known field, and bringing many curious and unexpected facts to our knowledge. But whether we are prepared always to agree with his explanations is not so clear. For instance, it must have struck many of his readers that the double wing-line might be simply the margin of the fringe and membranous wing respectively; but the question is in the hands of my valued friend Dr. Chapman, whose thoroughness in anything he undertakes is proverbial. My object, however, is to draw attention to a still more interesting fact recorded in that paper, namely, the complete sculpturing of plumose antennæ on the female pupa, when in the perfect insect the male only possesses them, and to offer a simpler and, I venture to think, a more satisfactory explanation than the one given in the paper.

I would premise in the first place, that although, strictly speaking, the antennæ can scarcely be called secondary sexual organs since they probably serve some general purpose, yet that there is a sexual side to them cannot be doubted, if we consider their highly specialised condition in many male insects. Next, turning to the highest of all animals, the *Mammalia*, we find that the mammary gland, from which they derive their name, is present in both sexes, but is only completely developed in the female. Moreover, it is a curious and well-known fact, that in boys at the advent of puberty, these glands become painful and enlarge, just as they do in girls at the same age, and we should infer, but that we know from experience it will not be so, that they were going to develop equally in both. Going back again to the insect, the larva may be considered the child, the perfect insect the adult, and the pupa the age of commencing puberty; the analogy, so far as sexual life is concerned, being strictly accurate. If then in the mammal the stimulus of awakening sexual development is so excessive or so ill-directed as to rouse into temporary activity and growth an organ that afterwards fails to develop, what should hinder the same thing from taking place in the insect, with only this accidental difference, that, whereas in the pupa the external parts are laid down in a hard imperishable material, the

temporary growth and development of the antennæ cannot be removed by absorption, as eventually the enlargement of the mammary glands is removed in the boy, but remain permanently impressed on the pupal skin.

Perhaps too the same hypothesis will account for the equally curious condition of the wing-cases in apterous species. It is quite possible, and to my mind probable, that the wings are correlated with the sexual organs—at any rate they are the most striking external character of the mature insect, and start into existence at the same time with the development of these organs. Though it may be somewhat extravagant, I feel tempted to liken the wings of insects to the horns of the *Mammalia*: the one being an organ specially provided for locomotion, the other for defence or attack, whilst both are in abeyance in early life, and both make their appearance with the advent of puberty. If this view of the relationship of wings be right, that is to say, if the wings be indeed correlated with the sexual organs, then the singular phenomenon of the pupal wing-cases in apterous or semi-apterous species being larger than those of the imago may, like the case of the antennæ, depend upon the superabundance and erratic stimulus of commencing puberty.

A DAY'S ENTOMOLOGIZING IN THE PARIS ENVIRONS (BAGNEUX).

By J. W. TUTT, F.E.S.

I HAD a full week to fill in between July 27th and August 3rd, and determined to run over to Paris. Of course I assumed that there would be no collecting to be done near Paris, and that I should find plenty to do otherwise. However, I added my satchel and collecting materials to my impedimenta at the last moment. I had been three days in Paris before I made up my mind to go to the outskirts of the city, and with this idea sauntered through the city to the Porte d'Orleans, and then wandered on towards Bagneux. The sudden and unexpected change from city to country life quite surprised me, and I was soon in the midst of cultivated ground, with scarcely a trace of waste land. A field of sainfoin attracted my attention, by the number of *Pieris rapæ* hovering there. "Surely that specimen is not *rapæ*!" flashed through my mind, and "it's *hyale*!" succeeded as rapidly. I stepped off the highway on to the field, a performance not difficult in France where there are no hedges, and immediately put up *Strenia clathrata*, another step and up flew *Lythria purpuraria*, and yet another and another. I had no net, nothing but six small pill-boxes, and into each of these, with the aid of my hat, six moths soon found their way. Half-way across the field was a notice forbidding further progress, and I found that the fields surrounded a French fort, and I surmised that it was probable that the fact of the ground being forbidden to the public made it, as it evidently was, such a good locality for insects. Although I could not collect these insects, I thought I could inspect the ground, and see what the locality would produce, and, at the same time, I wanted to detect the head-quarters of *Colias hyale* in that immediate neighbourhood. An hour's foraging into out-of-the-way corners at last landed me into an entomological paradise. It was another sainfoin field in full blossom,

and here I saw such a wealth of insect life as I have rarely seen before, and probably shall never see again. *Colias hyale* flew hither and thither, much disturbed by *Pieris rapæ* and an occasional *P. brassica*, and I sat down to watch them as I could not catch them. A beautiful moth hovers over a flower just near me, sucking honey from the flower all the time. Whish! my hat has brought it down. It was, as I surmised, *Acontia albicollis*. I have no pins, no boxes, the moth appears to be hurt but little, and off it soon goes again. Ah! there's another smaller moth, and another, and yet another! I know it of old: I saw it buzzing, and then indulging in its headlong flight less than a week since at Cuxton; it is *A. luctuosa*, and look! there are dozens of them. I get excited, but excitement has to cool where it is governed by helplessness. Then a *Crambus*-looking moth drops at my very feet, and as I turn to observe it, I am astonished to see the well-known features of *Agrophila sulphuralis*, and soon I notice others. I then thought I would investigate the sides of the field, and soon disturbed several *L. purpuraria* and *Botys cinctalis*. Both species were in lovely condition, and the latter, which I had taken rather freely in June in North Kent, was evidently a second brood. *Crambus culmellus* was the only species of the genus I could stir up, but my attention was soon riveted by a large butterfly coolly sailing along, and alighting within a yard of me. Yes, there could be no doubt about it! It was *Papilio machaon*. How different this dry region to its Fenland home in England! It took wing again, flew over a stubble field and disappeared; but I saw two or three others during the afternoon, although I could not discover their food and was evidently not at their headquarters. *Coenonympha pamphilus* abounded, as well as the pugnacious *Lycæna icarus*, a fine large form, which I thought was a different species until I caught one for satisfaction. Yes, I know that big fellow yonder! It's *megæra*, but what's that brown individual buzzing about with *luctuosa*? One's hat is useless, and I crack the brim in fruitless attempts to knock one down, but it was done at last. What else could it be but *Euclidia glyphica*? but I didn't recognise it until it was on the ground. Then a strange *Vanessa*-looking butterfly with a conspicuous eye-spot on the hind wings flits by followed by a large fritillary, neither of which were determined. There's a "skipper!" A wild rush and a knock with the hat hard enough to have killed ten thousand butterflies, and I've missed it: but I had my revenge on a brother of his afterwards, if not on his individual self, for a vicious sweep killed him outright, and I discovered it to be a species not British. *Strenia clathrata* swarmed, and then a stranger gets up from my feet: I follow it up. *Acidalia rubricata* in lovely condition, followed a few seconds afterwards by *Spilodes sticticalis*. This was getting exciting, especially with the hot sun sweltering and frizzling one into unknowable proportions. I never knew how vicious a collector I was till I saw all these insects and couldn't catch them. I walked on further, but found no other corner like this. I crossed an occasional *Colias hyale* and *Papilio machaon* in my wanderings, and, at last, slowly turned back, as visions of a 7 o'clock dinner floated before my mind. On the way back my ruminations were of a mixed kind, but that I would carry some of those insects back to England was the thought uppermost in my mind.

Alas for human expectations! For two successive days heavy

showers at the time available prevented a repetition of my visit, and it was not until the day before my departure that I could go again. The field round the fort attracted my attention, and the first thing that I saw was another net on the road in front of the fort. The notice boards forbidding entrance within the charmed circle were an awful nuisance, as the insects, probably knowing my inability to go there, all retired within this area. It was a nuisance, but first one insect and then another tempted me, until I got well up to the fort. One or two of the officers came and looked at me, appeared to vote me a harmless lunatic and went away, and I began to think that these boards were of the same value as those denoting that "Trespassers will be prosecuted" in England. However, I was soon undeceived, for presently a private soldier, evidently in a towering passion, came up and bullied me most dreadfully. Whether it was due to my natural disposition to allow myself to be bullied without saying anything, or to the fact that I didn't understand above one-tenth of what he said, I do not know, but I smiled sweetly at him and proposed staying where I was, but it was of no use, and he very firmly but politely saw me outside that ring of notice boards, and going back carefully inspected the ground I had affected, and he was still on his knees at the business when I disappeared out of sight, to the El Dorado I had discovered the week before. On my way, however, the weather became dull, and the sun-loving species which I had noticed in such profusion a few days before were only in small numbers. However, two or three hours sufficed to get together a representative lot of specimens from this locality. The species which I determined by actually catching specimens were as follows:—*Colias hyale*, *Coenonympha pamphilus*, *Vanessa atalanta*, *Pieris rapæ*, *P. brassicæ*, *Melanargia galatea*, *Lycæna corydon*, *L. icarus*, *Lastommata megera*, *Cuspidia psi*, *C. aceris*, *Acontia albicollis*, *A. luctuosa*, *Euclidia glyphica*, *Agrophila sulphuralis*, *Miana bicoloria*, *Lythria purpuraria*, *Strenia clathrata*, *Ematurga atomaria*, *Acidalia rubricata*, *Eubolia bipunctata*, *Crambus culmellus*, *Pterophorus monodactyla*, *Orthotænia striana*, *Pionæa forficælis*, *Spilodes sticticalis*, *Herbula cespitalis*, *Scopula ferrugalis* and *Stigmonota composana*.

The great surprise was the absence of *TORTRICES* and *TINEINA*. There were absolutely none of the latter, and I only got an odd specimen each of *Stigmonota composana* and *Orthotænia striana* among the former.

SCIENTIFIC NOTES & OBSERVATIONS.

SENSIBILITY OF LARVÆ TO SOUND.—A few days ago I was standing in my larvæ room, and while calling to my brother, who was outside in the garden, I noticed that some young *Bombyx quercus* larvæ in a cage close by were making very peculiar movements. Thinking that it was perhaps my voice which was affecting them, I went nearer and shouted as loudly as possible, when they all were at once thrown into great commotion, holding on to the stems and leaves of the bramble, on which they were feeding, by their hind claspers, and jerking their heads and bodies about in much the same way as many of the Geometer caterpillars do when disturbed. I shouted again twice, and each time I stopped they became quiet. After I had repeated the noise about a

dozen times they at last got used to it, and evidently thinking that my bark was worse than my bite, utterly ignored me; but on clapping my hands loudly and whistling shrilly they were once more startled, not having expected this change in my manoeuvres, and showed the same signs of annoyance as previously. There was a plate of glass in the front of their cage, so that nothing could have reached them but the sound. I have since then favoured them with several similar concerts, each time with the same results. They are evidently disgusted with my want of harmony.—ALFRED J. JOHNSON, Erdington. *August 10th, 1893.*

I have notes made this year very similar in effect to those written by Mr. Johnson. My first observation was in the open at Cuxton, when, calling to Mr. Page who was some distance from me, a brood of *Vanessa urticae* became most remarkably excited. They did not fall off their food plant, but threw their bodies rapidly from side to side, and were evidently much disturbed. This they did each time I called. Later I made the same observation on larvæ of *Callimorpha dominula* and *Nemeophila plantaginis*, which had been sent by the Rev. G. M. A. Hewett, and which were kept in a large glass cylinder in the greenhouse. Calling to my children in the garden threw them into similar excitement, but after a time, as Mr. Johnson observes with regard to the larvæ of *B. quercus*, these also got used to it; but after a short rest the same excited condition could be readily induced.—J. W. TUTT.

THE HYBERNATION OF *VANESSA CARDUI*.—I believe some notice occurred recently in the *Ent. Record* about *Vanessa cardui* hybernating in the British Isles. I took a worn specimen at Galway on April 25th.—J. E. R. ALLEN. *August 2nd, 1893.* [Mr. Woolfe, of Skibbereen, has kindly sent us larvæ of this species since our note, *ante*, p. 170. It appears to be excessively rare this year in Britain.—Ed.]

DEPRESSARIA AURANTIELLA, n. sp. ?.—On p. 253 of this Magazine is a remark by Mr. Hodges on some dark *Depressarias* being probably referable to *badiella*, "in Mr. Tutt's opinion." This is hardly my opinion! I caught a *Depressaria* at Deal, in 1888, very dark in colour, and marked somewhat similarly to *badiella*. It was remarkably distinct, however, in my opinion, and I had described it as a new species under the name of *Depressaria aurantiella*, the latter being derived from the remarkably distinct and striking orange-coloured palpi. Having got thus far, I submitted the matter to Mr. Stainton. He informed me that he had previously seen or heard of dark *badiella*, and he supposed this to be one, but he owned the orange palpi puzzled him. The matter has remained here ever since. I have not seen Mr. Hodges' specimens, so cannot tell whether they agree with mine. I hope, however, to be able to compare the specimens, and will report further. At any rate, I am satisfied that my species is distinct from *badiella*, and so far as I can get material, is not any of the described Continental species.—J. W. TUTT. *August, 1893.*

NOTES ON THE EARLY STAGES OF CERTAIN GEOMETRINA.—*Macaria notata*.—Ova laid July 10th, 1891: hatched July 23rd. Small—some olive green, others reddish—laid singly on outer side of muslin sleeve. August 30th.—Larvæ have all spun in sawdust. First imago emerged May 24th, 1892.

Acidalia immutata.—Ova laid July 26th, 1891; hatched August 2nd. On August 30th I made the following note:—"Growing very slowly; sit on twigs and leaves of chickweed, with anterior segments curled up;

colour, a dingy green; no characteristic markings." A note on October 4th is as follows:—"Some appear nearly full fed, others are quite small; they are still feeding on chickweed." Another on October 10th reads:—"Larvæ are spinning earthen cocoons;" and on October 17th:—"One can be seen to have pupated."

Ephyra punctaria.—Ova laid June 5th; hatched June 13th; beginning to pupate on July 9th; began to emerge July 20th. "The larvæ in its earlier stages is brown, with lighter lateral markings, somewhat resembling that of *Hibernia defoliaria*. At its last moult it becomes green with pinkish lateral markings. It undergoes pupation by attaching itself to the under side of an oak leaf by its anal claspers, then spins a single thread across the body, and changes to a green pupa with a very square head." On May 31st, 1892, I made the following notes on the egg of this species:—"Ovoid, small, covered with minute pits; pale straw colour, laid in twos on bits of fibre at edge of chip box."

Amphidasys betularia.—Ova laid June 24th; hatched July 7th. Ovoid, small, greenish grey in tint, smooth, scattered about box, some loose. July 6th, eggs becoming blackish grey.

Numeria pulveraria.—Ova laid May 31st, 1892; hatched June 10th. The eggs are oval, smooth; a depression (pit) extending over about half the surface in middle of oval; very pale straw colour, deposited singly about chip box. On June 10th, I note:—"Ova undergo no change before hatching; larva very pale green, with orange head."

Coremia unidentaria.—August 5th, 1892. Ova laid by dark ♀; hatched August 15th. Small, oval, pale lemon, laid on bottom of chip box, mostly single. August 9th—Have become more orange red in tint. August 15th—Became black a few hours before hatching. Larva brownish, with last segment pale.—F. J. BUCKELL, M.B. *July*, 1893.

TIMES OF EMERGENCE.—The following general times of emergence have been observed:—*Taenioctampa gothica* emerges about 8 a.m.; *T. instabilis* from 9 to 10 a.m.; *T. munda* from 10 to 12 a.m. and also at midnight.—T. A. CHAPMAN, Firbank, Hereford.

SECOND BROODS OF VANESSA IO AND ATALANTA.—I found, a few days ago, a small brood of *Vanessa io* larvæ now at their last moult. As the latest of the first brood emerged as butterflies two months ago, these must be a second brood. Mr. Merrifield tells me that a second brood of *io* is not recorded in England, nor, so far as he is aware, on the Continent, though it must probably occur at its most southern habitats.

He also calls my attention to a second brood of *atalanta*, of which the larvæ, now full-fed, are fairly abundant. The butterflies are still freely on the wing, but as there was a period without larvæ, these must be the second brood also.

In Mr. Barrett's work second broods of *io* and *atalanta* are not alluded to. The remarkable vanishing of the larvæ of *io* the moment they are full-fed is there noted. As bearing on the explanation, I may note that I met a full-fed larva seventy yards from the nettles in which several broods fed up, travelling vigorously, and the intervening space consisted of grass for mowing.

I cannot help calling attention to a specimen of *V. urticæ* recorded by Mr. Barrett, possessed of the larval head. We all, from time to time, meet with such examples. I had, last year, a *Zeuzera cæculi* and a *Zygæna filipendulæ* with the larval head; these cases are due to the larval head not being successfully moulted at the change to pupa.

Mr. Barrett's specimen is, however, infinitely more remarkable, as the larval head was developed within a normal pupa. I should certainly not have believed this had anyone but Mr. Barrett been the observer. Though *atalanta* is abundant, *to* is not to be seen now, though the larva was abundant, and the butterfly also for a short period. This seems to indicate that early as they emerged this year, they take to their winter quarters equally early, whilst *atalanta* refrains from doing so much longer, if not perhaps as long as possible.—T. A. CHAPMAN, Firbank, Hereford. *August 29th*, 1893. [Large and small larvæ of *V. atalanta*, taken at Galway by Mr. J. E. R. Allen on September 8th have just been received by us. We cannot however get larvæ of *V. urticae*.—ED.]

VARIATION.

COLOUR VARIATION IN THE PUPÆ OF *LASIOMMATA MEGÆRA* AND *L. æGERIA*.—Looking over your notes this morning in the *Record* regarding pupæ of *L. ægeria* and *L. megæra*, it may interest you to know that out of about 80 pupæ of *ægeria* I had very recently, every one was of the light green shade, and I have not yet seen a grey one such as you describe. Out of about 30 pupæ of *megæra*—one was of a dark olive green colour, and another of the velvety black form you describe. I send you the remains of this latter pupa; it was accidentally broken up. All the other pupæ were of a similar colour to the light green of *ægeria*.—S. G. C. RUSSELL, Priory Villa, Woking. *August 16th*, 1893.

VARIETY OF *ARCTIA CAIA*.—A larva of *Arctia caia* was brought to me last month, found on the pavement close to Highgate Road. I placed it in a box, 2 in. by 1 in., with some common marigold (*Calendula officinalis*) which it seemed to enjoy; so much so, that nettle, hollyhock, &c. failed in comparison to attract its attention. Just as it began to spin I transferred it to a cage. It has become a fine ♀ specimen, approaching the variety *lutescens*; the hind wings being orange, but the body and collar reddish.—GEORGE HOLLIS, Dartmouth Park Hill. *July 21st*, 1893.

VARIATION OF *CALLIMORPHA HERA*.—The specimens of *Callimorpha hera* which I have bred safely, came out two months earlier than their parents. They have done pretty well and would have done better but for deformities, of which there were many. The upper wings were nearly always perfect; but the underwings, and especially the left underwing, were often deformed. I do not think this was due to any fault in management, as Mr. Bird's, which were kept under much more favourable circumstances than mine, gave a similar proportion of deformities. We did not succeed in pairing them, I am sorry to say. The colour of the underwings varies from bright scarlet to yellow, with all intermediate tints. There are, however, three regular forms: the scarlet form, the yellow form and the orange form. The yellow and orange forms are both commoner than the scarlet form.—A. ROBINSON, 1, Mitre Court Buildings, Temple. *July 12th*, 1893.

ABERRATION OF *ARGYNNIS PAPHIA*.—I have got a very fine var. of *Argynnis paphia* from New Forest; right hand pair of wings ♀, left ♂. —P. BRIGHT, Bournemouth. *August 10th*, 1893.

DESCRIPTION OF *HIPPODAMIA VARIEGATA* VAR. *ENGLEHARDI*.—It may

interest some of your coleopterist readers to hear of an interesting variety of *Hippodamia variegata* (*Coccinella mutabilis*) that has occurred at Swanage, Dorset, this summer. At first I was inclined to think that it was entirely a new species, but upon close examination with the specimens in the British Museum collection, it was pronounced to be only a variety, but of such singular appearance, that I have considered it well worth recording.

The typical *H. variegata*, it will be remembered, has six distinct black spots on the latter half of the elytra and one on the scutellum, leaving the front of each elytron devoid of markings. In the variety there are placed, on the space usually vacant, two extra spots between the scutellum and the two usual centre spots close to the suture, and on the shoulders there are also two somewhat smaller spots, making in all thirteen distinct markings, instead of the usual seven. The thorax, moreover, is much darker; the white marking being almost entirely lost, save for the margin and two very small white dots in the centre. At first sight it might easily be taken for *Coccinella 11-punctata*, but may be easily distinguished from that species by the position of the spots. I propose to call this variety "*englehardi*."—BERTRAM GEO. RYE, 212, Upper Richmond Road, Putney, S.W. June 26th, 1893.

PRACTICAL HINTS.

THE MONTH.—Now the season for autumn larvæ commences, and many may be found that will enjoy their winter sleep in the pupal stage, and these the young collectors should try to obtain. Most of the butterfly larvæ are difficult to find, owing to their marked resemblance to the plant which they feed upon, or to their mode of feeding, usually quite hidden from the keenest eye. Still some may be found, and they are worth breeding. Many of the "hawk" moths are now feeding, such as *Smerinthus populi*, *tiliæ*, and *Sphinx ligustri*, all of which form interesting objects to the young beginner, and are usually easy to rear.

The freshly emerged imagines are not so numerous this month, but many of them are local and rare. The rare *Lycæna baticea* has been caught occasionally, also *Sphinx convolvuli*, *Deilephila lineata*, and *Cherocampa celerio*, all of which are rare; sometimes the energetic collector may also be rewarded with a specimen of *Catocala fraxini*.

The great sugar bait should still be "laid on" plentifully, more especially on the sea coast, where remarkable varieties of *Agrotis tritici*, *cursoria*, and others of the same family, may be obtained.—J. P. MURCH.

GATHER at once a calico bag full of the twisted heads of willow, sallow, or dwarf-sallow, tie up tightly and leave a few days, then turn out into a large close-fitting box. You should breed large numbers of *Peronea hastiana*. In turning out of the bag see that there are no pupæ in the folds.—J. W. TUTT. September, 1893.

CURRENT NOTES.

Lord Walsingham in the *E. M. M.* states that the collections of the late Mr. H. T. Stainton are now in the Natural History Museum and accessible to students. We are pleased to learn that the collection of

British insects is to remain intact, also that the European collection of *Tineidae*, which contains many of the types from which the original descriptions of the respective species were made, will also remain intact and be immediately accessible. The cabinets containing the exotic Micro-lepidoptera will have to be specially asked for by those who wish to refer to their contents.

Mr. A. Thurnall adds a new *Dichrorhampha* to the British list, viz., *D. alpestrana*, H.-S. The specimens were bred from larvæ found in roots of *Achillea ptarmica* growing in a damp spot in Epping Forest on March 11th last, the larvæ being "bone white with light brown heads." The imagines were well out on June 4th. These are "particularly stumpy and square looking, the markings putting one more in mind of *D. alpinana* than any other species of the genus." A description is appended (*E. M. M.*, pp. 175-176) together with a long note by Lord Walsingham on the synonymy of "*Dichrorhampha*" *subsequana*, Hw., under which name *D. alpestrana* is wrongly included in Staudinger and Wocke's *Catalogue*.

Mr. C. G. Barrett notes the occurrence and capture by Mr. W. M. Christy of a series of *Z. trifolii*, including several specimens of var. *lutescens*, first described in the *Young Naturalist*, vol. ix., p. 152.

A specimen of *Pieris daphidice* is reported as having been captured at Eastbourne on July 9th by Mr. C. Masters: a gynandrous *Argynnis paphia* by Mr. P. Carlew in the New Forest, whilst Mr. Goss reports *Lycaena arion* from North Cornwall. Mrs. Hanbury we understand has captured a specimen of *Leucania vitellina* in the New Forest and another in the Isle of Wight. Mr. Mathew records the breeding of 33 specimens of *Plusia moneta* from larvæ taken in May; and Mr. Purdey the capture of *Stigmonota (Halonota) ravulana* at Folkestone.

It is with regret that we record the death of the Rev. H. Burney, who died on July 16th, aged 79. He was an ardent collector of British lepidoptera, and has of late years increased his collection very largely by purchase from well-known professional collectors. This, as will be seen by reference to our advertisement columns, is shortly to be brought to the hammer.

A Mr. W. E. Sharp adds his quota to what he terms "the melanism controversy." The paper is written with a maximum of good taste and a minimum of information. He commences by stating that it has occurred to him that "the view the question assumes to one who compensates for the disadvantage of not being a specialist in lepidoptera, by the advantage of having neither preconceptions to sustain nor theories to enunciate on the matter, may not be devoid of interest," which, we presume, means in plain English that "not having devoted the time required to the consideration of this subject, and not having the information on the subject which can only be acquired by a specialist, I am in the satisfactory position of being able to thoroughly discuss the subject." That this view is fully carried out is shown by the subdivision of the problem into two parts *a*, and *b*, of which division the author immediately afterwards writes: "It will be seen that *a* and *b* may be considered as equivalent." In other words we presume the division has been made because there is no need for it. Mr. Sharp shows that he is not a specialist, for he writes: "Preponderance of individuals does not indicate the type, otherwise we should have now to regard the form *doubledayaria* as the type of *Amphidasys betularia*."

This will be news to the lepidopterists of all but our northern and north-western counties, and of those areas where melanism is particularly prevalent. Again he asks: "Have we any evidence of distinct melanism from South Staffordshire, East Worcestershire and South Wales?" Why does not an individual who asks such a question make himself conversant with such things, and instead of asking the entomological public such questions, write to our South Wales collectors (if he even knows their names), and to the Secretary of the Birmingham Natural History Society for information? Mr. Sharp then gives some definitions of "natural selection," "heredity," etc., for which we who are readers of *The British Naturalist* must give him special thanks, as he evidently does not rate our intelligence and reading power at a very high pitch. A further series of definitions follows, of which those of "outogeny" and "phyllogeny" stand out strikingly. We might have supposed that these were misprints for "ontogeny" and "phylogeny," but that they are repeated throughout a long paragraph. There are also some new ideas on the Gulf Stream, and the absence of its effects, which should be included in the next Syllabus on "Physiography," issued by the Science and Art Department, South Kensington. Really Mr. Sharp should get up the subject first and write about it afterwards, and should not criticise specialists till he has become a specialist in advance of those he criticises. Mr. Sharp's initial reason for supposing that what he wrote might "not be quite devoid of interest," does not seem a particularly strong one if we consider that every beginner at the subject has in common with himself no 'preconceptions to sustain nor theories to enunciate,' and that only those students have, who have devoted long and patient hours to thoughtful study and research, and who from such vagaries have at last obtained preconceptions which they can generally sustain amongst well-informed men, and have enunciated theories which they can convince specialists are at least sound enough to hold water. It is certainly to be hoped, however, that every beginner at Lepidoptera who feels called upon to treat us to his opinions, will do so in as nice a manner as has Mr. Sharp, because even if of no use to science they aid digestion by amusing us.

The Western University of Pennsylvania has just conferred the degree of D.Sc. on Frederick Moore, and that of Ph.D. on A. G. Butler, both of London, in recognition of their work in entomology (*Psyche*).

Our coleopterists would do well to read Mr. H. F. Wickham's paper (illustrated by 20 figures), entitled, "Some interesting colour-varieties in the genus *Crossidius*," published in the August number of *The Canadian Entomologist*, whilst to economic entomologists Mr. C. H. Tyler Townsend's paper on "Michigan insects, principally *Coleoptera*, affecting forest trees," to be found in the same number, should prove useful.

Micro-Lepidopterists will have to read Dr. Wood's paper (*E. M. M.*, p. 197) "On the earlier stages of the *Nepticula*." We can imagine nothing better for those who wish to become conversant with the habits, etc., of these interesting atoms in their earlier stages.

The Right Hon. Lord Walsingham states that specimens of *Conchylis degreyana* were recorded as bred from *Linaria vulgaris* by Messrs. Bree and Warren, although both he and Mr. Barrett generally found it among *Plantago*, and in 1889 he bred a specimen from *P. lanceolatus*. Lord Walsingham then concludes that there are two larvæ with

different habits, the one which feeds on *Linaria* habitually* descending to the ground to pupate, the other which feeds on *Plantago* pupating in the seed heads.

Mr. Durrant comes to the conclusion that the species we call *Conchylis anthemidana*, Curt., was never described by Curtis as such, but that the species he recorded as *subroseana*, bred from larvæ found on *Anthemis*, Wilkinson afterwards described as *anthemidana*, Curtis.

Mr. R. Newstead describes the new Coccid *Lecanopsis formicarum*, and states that Mr. Dale's record of *Bipersia tomlinii* (*E. M. M.*, xxviii., p. 219) really refers to this species, and adds *Physokermes abietis* to the British fauna, from specimens taken July 4th, 1891, in Delamere Forest on spruce fir.

We are informed by Mr. H. Ames that *Colias hyale* was seen in lucerne fields in the neighbourhood of Sheerness during the third week in August. Mr. J. J. Walker records it from the same locality. Mr. Page informs us of captures at Folkestone.

Another *Gelechia* gone wrong! Mr. Eustace R. Bankes refers the specimens called *Lita strelitzella* in the *Ent. Annual*, 1872, p. 123, and by means of which this species was added to the British List, to *Gelechia celerella* (Doug.), Sta. The same gentleman also repeats the facts embodied in our "Current Note" (*ante*, pp. 202-203) in the *E. M. M.* this month, in order to draw from Mr. Dale, if possible, some explanation of his remarkable statements concerning *Hesperia actæon*.

Our friend, Mr. Lachlan Gibb, contributes a paper to *The Canadian Entomologist* (July Number), entitled "Notes on Collecting some of the smaller Sesiidæ in the London (England) District." In it he states that in 1874 and 1875 he "took and saw several *Sesia tipuliformis* in Mr. R. Gibb's garden, St. Catherine Street, Montreal, among the currant bushes," and he further suggests that "it would be found in any of our old town (Montreal) gardens now."

The following notice may be of service to English workers:—"Dr. A. S. Packard has recently published two important papers on Heterocera. One deals with *The life histories of certain moths of the family Cochliopodidæ, with notes on their spines and tubercles*, and the other records the author's *Studies on the transformation of Moths of the family Saturniidæ*. The former paper is in the *Proceedings of the American Philosophical Society*, vol. xxxi, pp. 83-108; the latter in the *Proceedings Amer. Acad. Arts and Sciences*, 1893, pp. 55-92" (*American Naturalist*, July, 1893, pp. 681-682).

We are indebted to Mr. Nelson M. Richardson for his paper, "Notes on Dorset Lepidoptera in 1891," with splendid coloured figures from the careful pencil of Mrs. Richardson, of the food plant (*Pedicularis palustris*), the larva and imago of *Eupœcilia geyeriana*. Also to Mr. Carpenter for a copy of his paper (reprinted from *Natural Science*) on "Colour changes in Insects," in which the various recent views on the subject are very carefully put forward and discussed.

After Dr. Buckell's excellent criticism of Mr. Dale's ridiculous notes on "Entomological Nomenclature," we probably shall not be troubled with any more similarly undigested and erroneous material. We have to thank Mr. Dale for bringing Dr. Buckell to the front, and

* Mr. Warren mentions breeding a specimen from *L. vulgaris*, which must have pupated in a flowerhead.—Ed.

showing us that we have a lepidopterist exceedingly well informed on matters of this kind, and one who will undoubtedly become an authority to whom we may refer in matters of doubt. The general ignorance of lepidopterists on this subject has hitherto enabled dabblers to pick imaginary holes in the work of our best men—Staudinger and Kirby—and to win a cheap notoriety as literary enthusiasts; and even those who are purely collectors of British lepidoptera, occasionally try to become literary by giving us their valuable opinions on such subjects. A really trustworthy authority, who is at the same time one of ourselves, should put an end to this once and for all.

We should be thankful if any lepidopterist can inform us whether any butterfly, British or foreign, has an anterior and posterior movement?

NOTES ON COLLECTING, Etc.

NONAGRIA HELLMANNI IN LINCOLNSHIRE.—Notwithstanding very indifferent sport, I have continued to sugar all through this month some twenty trees in my garden and fields here. My virtue has at last been rewarded by a very surprising capture—that of *N. hellmanni*. It was sitting on July 29th, in company with *Triphæna pronuba* and *Apamea oculea*, on the trunk of a beech, bordering a field locally called “The Wilderness.” The centre of this field is devoted to growing potatoes and artichokes, whilst round the edges is a belt of ordinary forest trees—ash, beech, and elm, with rough grass, nettles, dock, etc., growing underneath. It is bounded on the E. side by the Rectory garden (highly cultivated!), on the W. by a farmyard, on the S. by a macadamised road, and on the N. by the churchyard. A more unlikely locality for that fen-loving insect, *hellmanni*, one could not easily conceive. There are no fens or marshes anywhere in this neighbourhood. But that my insect is *hellmanni* I am ready to maintain against all comers, as I have had considerable experience of the species, seeing that, in August, 1882, I took no less than 293 specimens in its favourite haunt, the Fen of Wicken!—(Rev.) G. H. RAYNOR, Panton Rectory, Wragby. *July*, 1893. [Our correspondent has forwarded this, with other specimens captured afterwards, to us for identification. There is no doubt that the species is *hellmanni*. Is it not the fact that in Monk's Wood, where it is also abundant, the Fen element is also absent?—Ed.].

PRIOR EMERGENCE OF MALES IN LEPIDOPTERA.—With regard to the note on this subject in the June number of the *Ent. Record*, I think the following may interest some of your readers. About the middle of June an example of the emergence of males being prior to that of females came under my notice. I was breeding *Ocneria dispar*: first I had ten male *dispar* emerge, and two or three days afterwards four females made their appearance.—S. B. CHANDLEY, Warrington. *July 10th*, 1893.

DEILEPHILA EUPHORBIAE.—I read in the “Current Notes” of this magazine for July, 1893, the following statement:—“*D. euphorbiae* with the exception of an occasional immigrant, has not been British for some three-quarters of a century.” Is this quite correct? I believe

the "perfect insect" has not been taken in this country, but larvæ have been found. A young friend of mine found, in the autumn of 1889, thirteen nearly full-fed larvæ on the West of Cornwall, feeding on *Euphorbia paralias*. He brought them home and entrusted the pupæ to my care, for they turned very soon after capture. Three died in pupating, one died during the winter, and nine came out perfect specimens, three of which are now in my cabinet. For fuller information I refer your readers to the *Entomologist*, vol. xxiii., pages 18 and 319.—J. SKYMOUR ST. JOHN, 42, Castlewood Road, Stamford Hill. July 21st, 1893.

[We were fully aware of the reports referred to by our correspondent, but at the same time venture to suggest that the statement in the "Current Note" referred to is substantially correct. In the face of what is known of this species in Britain, the statement "this very rare insect in Britain has this year re-appeared. A young friend this autumn came upon thirteen nearly full-fed larvæ," &c. (*Entomologist*, xxiii. p. 18) wants considerable amplification. Who is "the young friend"? What has he to say about the coming upon "thirteen nearly full-fed larvæ"? Mr. St. John has to rely on the statement of a "young friend," and this makes all the difference. If he had taken the species himself it would have been another matter. Mr. St. John further states that "the ten pupæ" (which successfully changed from these larvæ) "were entrusted to my care," so that he evidently never had the larvæ, an important item, considering how easy pupæ are to obtain. Mr. St. John exhibited three of the nine specimens reared, at the meeting of the Ent. Soc. of London, as "bred from larvæ found feeding on *Euphorbia paralias* on the Cornish coast, in September, 1889" (*Trans. Ent. Soc. of Lon.*, 1891, p. xxxi.) He records having searched for the larvæ himself in July, 1890, "on the spot where they were found the previous autumn" but "failed to discover any trace whatever of larvæ, young or middle aged." Mr. St. John must forgive our scepticism, but until we know something of the captor of these larvæ, we shall, in common with most British lepidopterists look on Mr. St. John as a probable victim in the matter. It would be interesting, however, to know the present whereabouts of these nine specimens which have been recorded, so that at any rate they may be distinguished from those that were sent on their wanderings last winter. We notice that Mr. St. John mentions nine specimens as being reared, in the paragraph above, but in September, 1890, he only mentions eight as having been reared, and one that looked like passing a second winter in the pupal stage.—ED.]

NOTES OF THE SEASON.

Midsummer collecting in North Kent.—In my contribution to the "Notes of the Season" last month, I recorded captures by myself and Mr. Page up to June 10th, when the species usually obtainable at Midsummer were appearing pretty generally. Our next visit to the woods was on June 17th. On this date insects were not particularly abundant. The day's work included the capture of further specimens of the second brood of *Lasiommata ægeria*, whilst *Euclidia glyphica* appeared also to be making an attempt to produce a second brood, and an extensive second brood of *Pyrausta nivalis* was on the wing. The early brood of this species is always a small one in Kent, the second producing a large number of specimens. *Zygæna lonicera* was in great abundance,

hundreds hanging on the flowers of the purple vetch or flying in the sunshine, whilst *Euthemonia russula* was fairly common, no less than ten females in beautiful condition falling to my net. The markings on the hind wings of the males varied much, some being without the usual dark band on the outer margin, whilst others had it specially well-developed. To a certain extent the same form of variation is found in the females, but the markings are not so obsolete as in some of the males. *Timandra amatoria* was turned up from the long grass at the corners of the "rides," whilst an odd specimen of *Cidaria pyraliata* was also disturbed, *Eubolia palumbaria* was apparently over, although a certain percentage of the large number of *Strenia clathrata* observed were still in fine condition. The first brood of *Ephyra omicronaria*, so conspicuous from its large size compared with the second brood, was still on the wing, as well as *Spilodes cinctalis* and *Asthenes luteata*. A few *Mimaseoptilus fuscus* (*pterodactyla*) were seen, as well as *Crambus perlellus* of a large creamy coloured type. A specimen of *Eupithecia plumbeolata*, and another each of *Botys fuscalis* and *Acidalia dimidiata* were netted, as well as several *Rhodophaea consociella*, the larvæ of which, in their conspicuous bunches on the oaks, had been abundant. *Cabera pusaria* was very abundant. Among the TORTRICES, *Spilonota rosascolana*, *Ephippiphora trigeminana*, *Chrosis tesserana*, *Dichrorhampha plumbana*, *Penthina sellana*, *Eupecilia angustana*, second brood of *D. acuminatana* and *Argyrolepis cneana* were captured, whilst fine specimens of *Psyche pulla*, *Parasia lappella*, *Tischeria dodonæa*, *Gelechia inopella* represented the TINEINA, which were decidedly scarce. A short series of a *Dichrorhampha*, which I have hitherto called *D. politana*, but which I feel satisfied is distinct from the ordinary form of this species, was also taken. This form I get every year. It has the orange blotch on the inner margin curved at the tip, and both the insect and the blotch are much larger than in the ordinary specimens of *D. politana*, which I have taken in abundance at Deal, Tuddenham and other localities. As evening came on, Mr. Page and I determined to stop till dusk, with the result that we got some very fine specimens of *Phorodesma bajularia*, *Hemithea thymiaria*, *Cidaria fulvata*, *Tortrix sorbiana*, *T. cratægana*, whilst we were also fortunate in securing a few very fine specimens of *Toxocampa pastinum*. Quite at dusk we had splendid sport with *Angerona prunaria*, a long series of fine examples rewarding our combined efforts.

June 24th was very showery, but gave us another day in the same woods. Of the species previously mentioned *Zygæna lonicera* was in the utmost profusion. I have looked over an endless number of living specimens of this species in my time, but never till this year have I seen a variety. On this occasion I captured two specimens with the top basal spot extending along the costa as far as the spot nearest the apex, forming a large red streak extending between the costa and costal nervure, and uniting with the upper of the central pair of spots, whilst the outer spot is extended so as almost to unite with the lower one of the central pair. A third specimen has a tendency to form the same type of variation. Generally speaking, the upper spot of the second pair in *lonicera* is very small, and very distinct and separate from the lower, but in some specimens it becomes large and variable in shape, whilst two or three specimens have the central pair of spots united as in the type of *Z. trifolii*. *Strenia clathrata* still continued to emerge, as also the second

brood of *Pyrausta purpuralis*, whilst specimens of *S. cinctalis*, *Asthena luteata*, *Zanclognatha grisealis*, *Crambus perlellus* (sheeny white), *Mimaseoptilus pterodactyla*, *C. pratellus* (freshly emerged) were also observed. The sides of the "rides" swarmed with *Spilonota dealbana* and its dark variety, *Grapholitha penkleriana*, *Dictyopteryx bergmanniana*, *Coleophora lutipennella*, and *Argyresthia albistria*, whilst *Orthotenia ericetana*, *Sciaphila pasivana*, *C. tesserana*, *A. aeneana*, *D. acuminatana*, *Dicrorampha* (? species), and *S. rosæcolana* were also observed. *Sericoris conchana* was abundant with *E. trigeminana* in a damp field; *Pædisca corticana* on the trunks of oaks, and *Dictyopteryx loeflingiana* were also common. The first specimens of *Hesperia linea* were observed, whilst *Boarmia repandata* started repeatedly off the tree trunks as we approached. *Agrotis exclamationis* was disturbed throughout the day, and *Triphæna pronuba* was a nuisance. A few specimens of *Eubolia mensuraria* and *Herbula cespitalis*, and a fair number of *Toxocampa pastinum* completed the day's work. As dusk came on *Angerona prunaria* began to fly freely, but the specimens were worn, probably owing to the showers which had been rather frequent during the last few days. *Lithosia mesomella*, *Tortrix crataegana*, *T. sorbiana*, *Phorodesma bajularia*, *Hemithea thymiaria* and *Rhodophaea tumidella*, all appeared in rather small numbers, their number probably being lessened by the wetness of the herbage and trees. *Spilodes cinctalis* was found on the privet blossom.

The evening of June 30th found me again at the woods. The first insect observed was *Enodia hyperanthus*, of which I disturbed several at rest on the trees. An open clearing in the woods then gave me an hour's hard work boxing *Botys fuscalis*, which was more abundant than I had ever noticed it before, whilst *T. pastinum* next appeared in considerable numbers. A "drive" completely covered in with trees, gave a good many *Angerona prunaria* flying freely, but chiefly worn, whilst in the same place I netted some richly coloured *H. thymiaria*. Odd specimens of *T. amataria*, *Hypsipetes elutata*, *Orthotenia ericetana*, *Tortrix pyrastrana*, *Acidalia aversata*, *Mimaseoptilus bipunctidactyla*, *Lomasipilis marginata*, *Nola cucullatella*, *Rhodophaea consociella*, *Cerostoma costella*, *Eupithecia plumbeolata* (freshly emerged) and *Tortrix sorbiana* I found had been boxed in the dusk, whilst *Ephippiphora inopiana* and *Ebulea crocealis* were abundant among the *Inula*, and an odd specimen of *Conchylis dilucidana*, quite new to this locality.

The next morning saw me on the way to Cuxton, where I had a most enjoyable day's collecting. *Ilithya carnella* was fairly common, but was altogether outdone by *Ennychia anguinialis*, *P. purpuralis*, *P. punicealis* and *H. cespitalis*, which simply swarmed. *Phycis subornatella* was moderately common, as also were the second broods of *Acidalia ornata* and *Phytometra cenea*. *Mimaseoptilus pterodactyla* was getting past, whilst *Acipitilia baliodactyla*, *A. tetradactyla*, *Marasmarcha phæodactyla* and *Eubolia bipunctata* were just commencing to put in an appearance; an odd specimen of *Sesia ichneumoniformis* was found in the net, but a long search revealed no more. I frequently take odd specimens of this species, although I could never find the species more abundantly. A very completely banded *Melanippe fluctuata* was netted, *Scoparia dubitalis* still hung on, as also *Crambus pascuellus* and *C. hortuellus*. *Batodes angustiorana* swarmed round the yews, whilst *Sericoris conchana* and *Phosopteryx comptana* abounded on the hills. *Sphaloptera ictericana*,

E. trigeminana, *Catoptria scopoliana*, *C. tessera*, *C. subbaumanniana*, *Peronea aspersana*, *Butalis fuscocuprella*, *Gelechia izmiola* were all more or less common, whilst odd specimens of the second broods of *Catoptria hypericana*, *Panalia leuwenhoeckella*, *Eupacilia erigerana*, *Dichrorhampha plumbana* and *D. plumbagana* were met with, as well as specimens of *Coleophora onosmella*, *Gelechia sequax*, *Conchylis dilucidana*, *Eupacilia amandana* (on buckthorn), *Platytes cerussellus*, *P. sellana*, and other species *Grapholitha nevana* being very common about the holly. Two beautiful freshly emerged specimens of *Argynnis aglaia* were captured, but it is no joke to take these on the sides of the comparatively bare hills; *Lycæna corydon*, a few females only observed; *Pamphila lineæ*, *Coenonympha pamphilus*, both fairly common, whilst *Lithosia complana*, in fine condition, and *Melanippe procellata* were captured. One of the strangest of my experiences took place to-day. I suppose I have been collecting since 1871 on these hills, and some fifteen years ago I found I had a couple of *Lycæna ægon* labelled from this locality. How, when and where I obtained them I never knew, and as, year after year, I found no more, and the species was quite unknown on the hills on this side of the Medway, I came to the conclusion that I had made an error in some way or other. To-day, whilst busy with the Tortricæ and small fry, I accidentally netted one of a number of what I thought was *Lycæna icarus* flying about the flowers of *Centaurea nigra*, when I noticed at once that the supposed *icarus* was *ægon*. I only took about a dozen specimens of both sexes, just enough to show that the former record was correct. I feel much puzzled as to what the food plant of the larva can be in this locality. The woods on the evening of July 5th gave me another lot of *Toxocampa pastinum* (rather worn), whilst *E. inopiana* and *E. crocealis* swarmed at dusk. A few freshly emerged *Edematophorus lithodactyla* were taken, as well as *S. clathrata*, *Z. tarsipennalis*, *P. purpuralis*, *Rivula sericealis*, and about a dozen freshly emerged *Eupithecia plumbeolata*, undoubtedly a second brood. Another odd specimen of *O. ericetana*, one of *Euchromia rufana*, a few freshly emerged *Scoparia ambigua*, *Acidalia bisetata*, *Crambus culmellus* with *Gelechia inopella*, *Parasia lappella* and *Eupithecia satyrata* completed the evening's work. (*To be continued*).—J. W. TUTT. July, 1893.

Isle of Man.—Ragwort is now in splendid condition for working, the flowers being in full bloom in many parts of the island. Everything has been exceptionally early this season. *Hydræcia micacea*, *Xanthia cerago* and *X. silago*, which are generally August and September insects with us, came freely to the flowers of the plant referred to last evening (July 27th). *Mania maura* too has been extremely plentiful at "sugar." *Epunda nigra* has not turned up yet, but I expect it will soon.—H. SHORTRIDGE CLARKE, Sulby Parsonage, Lezayre, Isle of Man.

Isle of Wight.—Sugaring has distinctly improved during July, but the woods have given very unsatisfactory results in this direction, even the commonest species being much more easily attracted to treacle on the downs than inland. I am rather inclined to agree with Mr. Battley's theory (*ante*, p. 226), however, to this extent: that in certain seasons Nocturæ appear to be far less voracious in their appetite for "sweets"—artificial or real,—than in others, and in such seasons display the "loafing" tendency observed. With regard to the relative attractions of honeydew and "treacle" in the wood I work, the latter,

although on a very extensive scale, is but as a drop in the bucket compared to the quantity of the former. My first successful evening with common *Noctua* on the lower slopes of the downs was July 5th, but the experience has been several times repeated, and no blank evenings have, up to date of writing, occurred for some time past. The species taken embrace *Agrotis puta* (in swarms), *A. suffusa*, *A. nigricans*, *Miana furuncula*, *Caradrina blanda* and the usual list of what should usually occur here all through August, together with a single fine *Mamestra abjecta* and a few *Triphaena interjecta* and *Gonophora derasa* (fine). On the grassy slopes of the cliffs facing South, *Micros* were very early, *Botys flavalis*, *Stenia punctalis*, *Tortrix francillana* and the usual three common *Pyraustas*, all occurring in some numbers with others unknown to me. Two or three very dark *Depressarias* captured are probably to be referred (in Mr. Tutt's opinion)* to dark varieties of *D. badiella*. The number of different species of *Noctua* observed at sugar on one evening was at least 27, several other evenings producing more than 20 species. The most unusual visitor was a single fine *Tethea subtusa*, at least 500 ft. above the sea on the crest of the downs. *Nonagria geminipuncta* has been very scarce in its usual headquarters, but I discovered a small corner hitherto unworked which yielded well; it is also very early, the first emergence being on July 23rd. Among butterflies *Colias edusa* has been observed in several spots and on different occasions, but hitherto seems to delay its appearance in the hoped for profusion.—ALBERT J. HODGES. *July 25th.*

Since writing the foregoing notes I have been successful in taking at sugar, on July 29th, a very fine specimen of *Leucania albipuncta*, the first I have ever seen alive although working the same district for several seasons previously. Insects were very plentiful and on the sugar freely, *A. puta* being especially abundant. Renewed work failed on my part to produce another specimen, and I had unfortunately to leave Freshwater on July 31st. My brother and friends continued working for me during August, and took the first *A. obelisca* at an unusually early date (August 5th). I hear of a few captures of *Colias edusa* during the third week of the month, but they seem very scarce compared with last year, at least in our district. During the month, sugar has proved very disappointing, and the captures in my absence have been consequently few, *A. obelisca* being almost absent; but there is plenty of time for a good autumn yet, of which, however, up to the 25th (the date of writing) the signs are very few.—ALBERT J. HODGES. *August 25th, 1893.*

Wicken.—I have made my first acquaintance with the Fen district this year, having visited Wicken on four occasions. The season there has, so far, been a very unsatisfactory one, and good insects have been scarce. I made my first visit on the 2nd June for three days. Mr. Albert Houghton sugared for me his ride or drive, in the fen and the lane leading to it, and allowed me also the benefit of his lamp and sheet. The weather was dry and fairly still, but the wind was in the east and the sky at night, as a rule, clear. Not a single insect appeared at the light. Sugar was better; it paid best in the lane. We took 33 specimens of *Apecta advena* (it seems to have been an *advena* year: I took it also in my house here at light, and have heard of it at Winchester), but nothing else of importance, except two *Neuria*

* See "Scientific Notes," ante p. 241.—ED.

saponariæ. Besides these, there occurred at sugar, *Hadena oleracea*, *Agrotis segetum*, *Apamea gemina* and *Miana strigilis* which were all very abundant, and *Mamestra anceps*, *Apamea basilinea*, *Grammesia trilinea*, *Xylophasia hepatica*, *Hadena adusta*, *H. pisi*, and *Euplexia lucipara*. At dusk I netted a short series of *Herminia cribralis*, just freshly out, but neither *Meliana flammea* nor *Viminia venosa* appeared at all. One day I drove with Mr. Houghton to Tuddenham for *Agrophila sulphuralis*, which was conspicuous by its absence, the only insect we took there was one very fresh *Lithostege griseata*. The hill side on which *sulphuralis* and *griseata* feed was literally burnt up, and very little of the food plant was visible. The only thing that grew there was *Senecio jacobææ*, every plant of which was literally covered with larvæ of *Euchelia jacobææ*, and there were imagines of the same flying about, whilst I hear that *sulphuralis* has not been taken at all this year by the local collectors. On our way home we looked in at Chippenham Fen, and in a very few minutes secured nearly four dozen *Banksia argentula*.

My next visit to the district was for two nights in the first week of July. The weather was fine and very hot, but the sky was clear and the wind in the east. I was told on my arrival that light had been unproductive throughout the season, except on one night (when Mr. Houghton was ill), on which Mr. Solomon Bailey took a few *Macrogaster arundinis*. It was no better while I was there. At dusk I netted a few *Epione apiciaria* and *Lobophora sexalisata*. *Nudaria senex* was the only moth which visited the lamp. Sugar was rather more productive in the fen than on my former visit, less so in the lane, but very few species were represented. *Leucania pudorina* and *Apamea fibrosa* were there in abundance, with beautiful forms of the latter and *L. pallens*; *Xylophasia polyodon* and *Agrotis nigricans* were quite a nuisance. We also saw several *Calamia phragmitidis* and commoner species, such as *Lithosia griseola*, *L. complanula*, *Leucania lithargyria*, *L. conigera*, the *Caradrinidæ*, *Axylia putris*, *Noctua festiva*, *N. plecta* and *N. augur*. The two events which pleased Mr. Houghton most during this visit were the appearance of *Heliothis marginatus* at sugar in the fen (he said he had never seen it there before), and the taking of *Agrotis ravidæ*. He had previously (at the end of June) taken 18 *ravidæ* in one night, but had hardly seen another. *Cuspidia strigosa* and *Cymatophora ocularis* have been very scarce this year; the two local collectors, Mr. Houghton and Mr. S. Bailey have each taken one of the former only, and less than half-a-dozen *ocularis* have been taken altogether. The following week I again went to Wicken on July 12th for two nights. This time there was rather more wind, as usual from the east, and a good deal of wet. The nights were also darker, but the change in the atmospheric conditions did not make much difference to the moths. There were more *A. fibrosa*, and *L. pudorina* (the latter much worn), and more *C. phragmitidis*; also a good many *L. griseola*, *Calymnia affinis*, *Nænia typica* and *Amphipyra tragopoginis*, but very little else. At dusk I netted *Pelurga comitata*, *Strenia clathrata* and *E. apiciaria* (which were getting worn), but the lamp produced nothing. So far I had visited Wicken three times and had never seen an insect on the sheet. On this occasion the second brood of *Papilio machaon* was fully out, which is rather an early date for it.

This week I have again been to Wicken for three nights, with an almost similar result. I heard that a very few *Nonagria hellmanni*, have been taken, and *Cænobia rufa* and *Viminia venosa* have occurred

sparingly since I was last there, but I was again doomed to be disappointed. This time it was certainly not the fault of the weather. My first night was warm, dark and moist, a slight south-west wind and a few drops of rain, but hardly an insect came to light, very few to sugar in the fen, and sugar in the lane was useless. In the fen we have taken *A. fibrosa*, *C. phragmitidis*, one *N. rubi* and one *A. tragopoginis*. At dusk I have netted *E. apiciaria* (a new brood), *Coremia unidentaria*, *Cidaria testata*, and *Hypsipetes elutata*, and one *C. rufa*. I have actually seen one *V. venosa* on the sheet!

I may add that both Mr. Houghton and Mr. Solomon Bailey look upon the season as one of the very worst they have known.

Naturally one wonders what is the cause of this great scarcity of moths. During my first three visits it is true that the wind was easterly, but there was very little of it, and it was not cold; but during my last visit the wind has been southerly and south-westerly. The night of August 1st was almost an ideal night, but practically nothing came either to light or to sugar. Where are the Bombyces which usually swarm at light at this time of the year? Where are the common *Agrotidæ* and *Nocturæ*? The failure of sugar in the woods this year has been ascribed to the prevalence of honeydew, an opinion which the greater success of sugar on the downs and the affection of *Argynnis paphia* and *Limenitis sibylla* for the trees go far to endorse, but that will not account for the comparative failure of sugar and light in the fens this year, which can, I think, only be accounted for by an actual scarcity of moths. I venture to suggest two causes for this, and shall be glad to know how the matter strikes others. (i.) That the intense drought of the early part of the year has greatly increased the number of the enemies of Lepidoptera, such as wasps, beetles, &c. (This might also, in some measure, account for the strange scarcity of larvæ in the New Forest this July). (ii.) That many pupæ have, from whatever cause, declined to emerge this season. I believe it is the experience of others who are breeding insects, besides myself, that an unusually large proportion of, apparently, still quite healthy pupæ have failed to emerge this year.

The comfort of residence, and ease and convenience of collecting at Wicken, have, according to my experience, been by no means exaggerated by Mr. Tutt in his notes on that locality. I have, during all my visits, been exceedingly comfortable and well cared for in Mrs. R. Aspland's lodgings. I have been most completely and attentively arranged for in my entomological work by Mr. Albert Houghton, and I have been punctually and conveniently carried to and from the railway station by Mr. John Bailey in his cart for a most moderate consideration. I therefore fully intend to regard the failure of collecting at Wicken this season as being abnormal and exceptional, and to repeat my visits next season hoping for better success.—J. C. MOBERLY, Southampton. August, 1893.

Guernsey.—During my stay in Guernsey during August, I have been able to do but little collecting owing to pressure of business. A worn *Callimorpha hera* I knocked down and captured in the first week of the month near Bordeaux Harbour, and picked up a ♂ *Bombyx trifolii* near the same spot a week later. An expedition to Sark with Mr. Luff after *C. hera* on the 15th proved a failure, owing probably to the early season; but it is worthy of remark that we captured a fine fresh ♂ *Melitæa cinxia*, a very late occurrence, particularly as I took

them plentifully here during April. *Lycæna argiolus* was very common, and Mr. Luff informs me that the larva here feeds freely on the flower of the common bramble, which appears either to be a local food plant for it or one not generally known. Sugar on the 11th near Bordeaux Harbour produced one *A. saucia*, and several *Caradrina superstes*, with *Hadena chenopodii* and abundance of commoner species. A second attempt on the 14th resulted in a good series of *C. superstes*, which then entirely replaced *C. blanda*, whereas sugaring in July and September in former years near St. Sampson's, I have found *superstes* in a great minority compared with *blanda*. A specimen quite new to me I also captured, which Mr. Luff and myself agree in identifying as *Agrotis crassa*, although not quite corresponding with the two specimens in Mr. Luff's collection. A pair of *A. obelisca* and a single fine ♂ *A. lunigera*, rather different from the Isle of Wight form, occurred (a very late date again for so early a season), and which may turn out to be some closely allied species in the continental fauna. *Acidalia promutata* also occurred freely and in good condition, together with an occasional *Eupithecia centaureata* and *E. pumilata*. A few nights later I took in the same spot another specimen of the doubtful *Agrotis crassa* in better condition, with two ♀ *A. lunigera* and one or two *A. obelisca*, doubtful because worn, together with a single *Leucania putrescens*, rather worn. We at once organized an expedition to Ferman Bay after this very local species, but it again turned out unsuccessful, there being very few moths indeed at the sugar, either on tree trunks or flower heads, and these, with the exception of one or two *C. superstes*, were of the very commonest species. This result caused me to return to my old locality, where I had another very good night on the 19th, and captured another specimen of a species unknown to myself and which Mr. Luff is unable to identify,—in my opinion a *Luperina* allied to *L. testacea*. Our other captures include *Cerigo cytherea*, *Bryophila perla*, *B. glandifera*, *Agrotis saucia*, with one *A. suffusa*, a few worn *A. puta*, and some few fine forms that I refer to *A. tritici*, a good series of *Caradrina superstes*, and had we wished them, an abundance of commoner Noctux. My last expedition was on the 24th, when I was unfortunate in my choice of the evening, the wind being decidedly cold and the moon very bright. Common Noctux, principally *A. segetum* were feeding freely, but *C. superstes* was almost absent, only four or five being seen. We captured nothing of note, but *A. saucia* and *Bryophila glandifera* were fairly common. I expect to return to Freshwater before the end of the month, and hope to be able to report an improvement before the 15th. I omitted to note the recurrence, so late as August 24th, of *A. lunigera*, which has been over at Freshwater practically a month; we took three ♂ and one ♀ in good condition.—ALBERT J. HODGES, Guernsey. August 25th, 1893.

Morpeth.—Insects are a little more plentiful at present than they were in the early part of the season. I swept the following off the heather blossom on August 7th:—*Noctua glareosa*, plentiful; *N. dahlia*, a few; *N. neglecta*, a few; *N. xanthographa*, plentiful; *Orthosia suspecta*, three; *Agrotis suffusa*, one; *Celæna haworthii*—as far as my experience goes with this species, what are taken on the wing during the afternoon are invariably males, but with the sweeping net you get the females; *Charaxes graminis*—I got three pairs of this species in cop. at 10.30 p.m.; the males of this species are on the wing from 7.30 to about 10 a.m., but I have never taken any females at that time. *Ypsipetes clutata*, very plentiful;

Cidaria immanata, *Hydroecia nictitans*, plentiful; *Xanthia cerago*, two, rather soon for this species here. I got two specimens of *Cirrhædia xerampelina* at the base of an ash tree on August 19th at 6 p.m., also on the trunks of ash trees I captured *Polia chi* var. *olivacea*.—J. FINLAY, Meldon Park, Morpeth. August 22nd, 1893.

Ireland.—Neither sugar nor light have been worth much the last two months, and the results of sugar have been only swarms of *Xylophasia monoglypha* and *Triphæna pronuba*. Nor have Geometers latterly been much on the wing. I have beaten for larvæ also in good localities, both in Kerry and Galway, but the exercise is tiresome when unproductive. In Kerry I scarcely took one larva for a half-hour's work, especially on oak, and in Galway I found sallow and birch gave me the best results, but even these were meagre. Not one of *Smerinthus ocellatus* or *populi* for 20 last year. I think birds have devoured them this hot season. While in Kerry I procured a few melanic vars. of *C. bilineata*, and one ♀ laid some ova.—W. F. DE V. KANE. July 27th, 1893.

SOCIETIES.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—August 1st, 1893.—Exhibits:—Dr. Buckell: a copy of the first edition of Doubleday's *List of British Lepidoptera*, bearing date 1850; this copy was kindly lent for exhibition purposes by Mr. J. E. Robson. Mr. Smith: examples of *Macroglossa fuciformis* and *M. bombylifomis* from the New Forest. Mr. Gates: *Batrachædra præangusta*, *Dictyopterix contaminana* and *Halonota brunnichiana* from Hammersmith. Dr. Sequeira: series of *Geometra vernaria*, *Nemoria viridata* and *Pseudoterpna pruinata* (*cytisaria*) from the New Forest; also dwarfed specimens (mostly bred) of *Thecla betulæ*, *Notodonta ziczac*, *Dicranura furcula*, *Amphipyra pyramidea* and *Catocala sponsa*. Mr. Nicholson: an abnormally large ♀ specimen of *Ocnèria dispar*, bred this season; also a very fine var. of *Smerinthus tilia*, which had been bred by a friend, the insect was of the reddish form, but showed no traces of the broad central band. Mr. Riches: a fine batch of full-fed larvæ of *Smerinthus tilia*; also examples of the leaves of the side-saddle flower (*Sarracenia*), and both flowers and leaves of the pitcher plant (*Nepenthes*). Mr. Riches expressed his doubt as to the reported carnivorous propensities of *Nepenthes*, but upon reference it was found that these propensities have been attributed to the genus on no less authority than that of Sir J. D. Hooker, who, in his address to the British Association at the Belfast meeting in 1874, recorded many experiments, shewing that the acid juice secreted at the base of the pitcher is indeed capable of digesting meat and other nitrogenous matter. Mr. Battley exhibited a fine series of *Zygæna trifolii* from Broxbourne, the variation ranging from the type to the *confusa* form. Captain Thompson: a very fine series of *Tapinostola elymi* bred from pupæ from Hornsea, on the S.E. coast of Yorkshire. Captain Thompson stated that in the hope of emulating Mr. Porritt's success in taking this species at Cleethorpes, he had requested his friend, Mr. P. Inchbald, who resides at Hornsea, on the other side of the Humber estuary, about 25 miles north of Spurn Point, to look out for the food plant of the species, viz., the Lyme grass (*Elymus arenarius*). In May, Mr. Inchbald reported that he had not found the *Elymus*, but that the marram (*Ammophila arundinacea*), a

species similar, though not allied to *Elymus* was common on their coast. During the same month, however, Captain Thompson received a number of pupæ of *T. elymi* from Mr. Inchbald; these had been found by that gentleman and his sister, Miss Inchbald, whilst working what was thought to be *Ammophila*, but was in reality the *Elymus* growing side by side with it on the sandhills, in hopes of obtaining *Leucania littoralis*. The fact was that *Elymus arenarius* occurred in some plenty on the Hornsea sandhills, but that the species is difficult to separate from *A. arundinacea* except by its inflorescence, and so had been overlooked. Mr. Heasler exhibited a strange var. of *Philonthus splendidulus* from Beckenham; the curious point about the insect being the absence of the dorsal series of punctures on each side of the thorax, which are so characteristic of the genus.

Tuesday, August 15th, 1893.—Exhibits:—Mr. Oldham: a series of the males of *Odonestis potatoria*, varying from dark brown to yellow, some being paler than the ordinary females; also *Triphæna fimbria*, *T. orbona* and *Cosmia affinis* from Woodford. He also brought some ova of *Strenia clathrata* for distribution. Mr. Nicholson: a bred series of *Thecla betulæ* from Epping Forest. He remarked upon the large preponderance of females in this species. Mr. Clark: *Triphæna fimbria*, *Lycæna ægon*, *L. argiolus*, *Cerostoma radiatella* and *Crambus adipellus*, all from the New Forest. Mr. Battley: living larvæ of *Polyommatus phleas*. Dr. Buckell: larvæ and pupæ of *Euthemonia russula*. He stated that most larvæ out of a brood of this species had fed up rapidly and passed into pupa, but the remainder appeared to be about to hibernate. He also exhibited a series of *Agrotis puta* from Freshwater. Mr. Bloomfield: a specimen of *Gonepteryx rhamni* from the New Forest, intermediate in colour between the two sexes. Mr. Gates: *Arctia mendica*, *Hecatera serena*, *Tanagra chærophyllata*, *Platyptilia gonodactyla*, *Cemiostoma laburnella*, *Lithocolletis tristrigella*, *Argyresthia goedartella*, etc., all from Shepherd's Bush. Mr. Bacot: a bred series of *Vanessa polychloros* from the New Forest. Mr. Hockett: a bred series of *Ennomos angularia*. He remarked that these had begun to emerge from the pupa during June. Mr. Southey: a bred series of *Cerura vinula*. Coleoptera:—Mr. Heasler: *Oodes helopoides* and *Pæderus riparius*, both from Hanwell. Mr. Clark stated that while sugaring in the New Forest he noticed a hornet pounce down upon a wasp and, after a long struggle, kill and eat it. He also remarked upon the large numbers of these two insects this season. Mr. Hockett stated that some larvæ of *Arctia caia* reared from the egg were already spinning up. Mr. Southey reported that *Hepialus sylvinus* was common on Hampstead Heath, but that the usual *Nocturæ* appeared to be very scarce. Mr. Bloomfield gave an account of an excursion to Wicken Fen on August 5th, *Cenobia rufa*, *Tapinostola hellmanni* and *Helotrophæa fibrosa* being some of the best insects observed. The larvæ of *Papilio machaon* were scarce and very small, the greater part being only just out of the egg.*

Tuesday, 5th September, 1893. Exhibits:—Mr. Prout, a variety of the underside of *Lycæna corydon*, two specimens of *Leucania albipuncta*, and a dark reddish unicolorous variety of *Hadena suasa*, all from Sandown. Mr. Hollis, a specimen of *Arctia caja*, with orange hind wings, and a pale specimen of *Coenonympha pamphilus*, with dark borders

* These were undoubtedly from the July insects, vide ante, p. 234.—Ed.

to the wings. Mr. Battley, a series of *Leucophasia sinapis* (2nd brood), from Sidmouth, S. Devon; the males with remarkably dark apical marks. Mr. Clark, three varieties of *Arctia caia*, bred from Tottenham larvæ, the ground colour of the hind wings being suffused with black; and some fine forms of *Arctia lubricipeda* vars. *zatima* and *deschangei*, bred by Mr. Harrison, of Barnsley. He also exhibited a large number of insects taken during July, in the New Forest. These included *Argynnis paphia*, with its var. *valezina* and intermediate forms, xanthic specimens of *Satyrus janira*, suffused examples of *Ennomos angularia*, *E. erosaria*, black *Boarmia abietaria*, *Lithosia quadra*, a remarkable male, with the fore wings yellow on the outer margin; *L. helveola*, *Catocala sponsa*, *C. promissa*, *Elulea stachydalis*, *Tortrix piceana*, and many others. With regard to the vars. of *A. paphia*, Mr. Tutt remarked, that several of the males were distinctly green on certain portions of the hind wings, and that frequently, these specimens were those which developed pale spots, both on the hind and fore wings, thus showing a double tendency towards var. *valezina*, the area round the pale spot being the first to become green. Dr. Buckell, a series of *Apamea oculatea*, all taken in one evening at Highgate, also other forms for comparison. Mr. Lane, a bred series of *Thecla betulæ*, from Epping Forest. He remarked that his experience of this species was directly contrary to Mr. Nicholson's, expressed at the last meeting, only about one-fifth of the specimens bred being females. Mr. Smith, *Lithosia complanula*, *L. griseola* and var. *stramineola*, all from Dorset, and *Ennomos erosaria* (bred) from the New Forest. Mr. Hockett, specimens of *Arctia caia*, bred within the last few days (2nd brood), and a remarkable unicolorous leaden-coloured male of *Lycæna adonis*, taken at Folkestone, on 23rd August, 1893. Dr. Sequeira, *Boarmia repandata*, *Ephyra porata*, *E. punctaria*, *E. orbicularia*, and the second brood of *Lycæna argiolus*, all from the New Forest. Coleoptera:—Mr. Heasler, *Staphilinus stercorarius* and *Hippodamia 13-punctata*, both from Teddington. Dr. Buckell stated that he had counted the heart-beats in the larva of *Phlogophora meticulosa*, and found them to be 44 to the minute. He also made some remarks upon the experiments now being conducted by Mr. Garner with regard to the powers of speech in the apes. Capt. Thompson recorded a specimen of *Nonagria lutosæ*, in High Street, Islington. Mr. Hockett stated that he had noticed a sallow and a pear tree in blossom, at Folkestone, and several cases of second flowering were recorded by other members. A discussion also took place with respect to the absence of the autumnal larvæ this season, Mr. Tutt expressing his opinion that they had emerged from the egg early in the season, and, feeding up rapidly, passed into the pupa towards the end of July. Dr. Buckell and Mr. Riches, however, stated that the common species had been comparatively scarce this season in their gardens.—A. U. BATTLEY and J. A. SIMES, *Hon. Secs.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—August 10th, 1893.—Mr. Weir exhibited some cases which had been found under a sycamore by a neighbour of his, Mr. Tolhurst, at Beckenham, Kent. He said attention had been called to these cases by seeing them hopping over a gravel walk, a power which they retained for some days after they were obtained. The cases were circular discs about 13 mm. in diameter, the upper cuticle of the sycamore leaf, forming one side, and silk the other. Upon examining the leaves of the tree, the round spots, from which the cases were

partly formed, were plainly visible, and also the large blotch from which the larva had eaten the parenchyma. They have since been identified by Mr. McLachlan as the work of a saw-fly, *Phyllostoma aceris*, Kalt. The President also exhibited nearly adult larvæ of *Hemerophila abruptaria*, and drew attention to the fact that two pairs of prolegs were, as usual in Geometers, fully developed, and that there were also two other imperfect pairs in front of these. He considered these very imperfect prolegs to be vestigial. Mr. Frohawk exhibited specimens of *Macroglossa bombyliförmis*, together with a species of humble bee, which it mimics, taken in company over rhododendrons in the New Forest, on 21st May last. Mr. Robert Adkin exhibited a specimen of *Sesia cynipiformis*, in which the usual red colour of the band of left fore wing and a portion of the costal streak were replaced by yellow; also a series of *Spilosoma lubricipeda*, reared from Barnsley parents, in some of which the spots showed a tendency to become elongated. Mr. Oldham exhibited series of *Sphinx ligustri*, *Apamea ophiogramma*, *Calymniu affinis*, and other species taken at Woodford.—H. WILLIAMS, *Hon. Sec.*

NOTICES AND REVIEWS.

Brief Guide to the Common Butterflies of the Northern United States and Canada, by S. H. SCUDDER (Published by H. Holt & Co., New York). Price 5s.—This little book, from the author of one of the best scientific books on Lepidoptera ever published for the general reader, is in itself quite unique and would form a good model for a similar little treatise on our own British Butterflies, since all our books on them are either a quarter of a century old, or if more recent have been written up in the light of our knowledge about the middle of the present century. The "Introduction" consists of a series of short articles on scientific subjects written in popular form, and as useful to the students of lepidoptera in all countries as to those for whom they are primarily intended, their simplicity making them especially valuable to less advanced students who are seeking for light. But to us the most important part of the work is the series of scientific classificatory tables (pp. 34 to 59), in which the author gives a key to the various groups into which butterflies are divided, as shown in the egg, larval, pupal and imaginal states. This sort of work has been sadly neglected by those who have attempted to write books on this subject during the last forty years in England, and when one looks through a list of those who have made the attempt, it does not do to enquire too closely why? But these tables deal with our British genera (often with our British species) and hence are as useful to us as to American lepidopterists. The descriptions and notes on *Anosia plexippus*, *Euvanesa antiopa*, *Vanessa cardui*, *V. atalanta*, *Cyaniris pseudargiolus*, *Pieris oleracea* and *P. rapæ* will give English readers an insight into the distribution of well-known European insects in North America. Each butterfly dealt with has a short summarised description of the imago, caterpillar and chrysalis, followed by general notes on its food plants, habits, distribution, etc. The glossary of entomological terms will prove generally useful; whilst the instructions for collecting, rearing and preserving larvæ, pupæ and imagines, are of the kind generally given to entomologists.—Ed.

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The President's Address to the British Association considered in its relation to Entomology.

By J. W. TUTT, F.E.S.

It will not, perhaps, be out of place to bring before our readers a few of the remarks made by Dr. Burdon-Sanderson in his inaugural address to the British Association, at Nottingham, on September 13th. Not that they deal particularly with Entomology *per se*, but since they deal with biology in its broadest sense, entomology, of necessity, is included in the generalisations. The learned Doctor defines biology as "the sum of the knowledge which has as yet been acquired concerning living nature," and he further states that the term was first employed by Treviranus early in the present century. With regard to this definition he says:—"It suggests the *idea of organism* as that to which all other biological ideas must relate. It also suggests, although perhaps it does not express it, that *action* is not an attribute of the organism but of its essence—that if, on the one hand, protoplasm is the basis of life, on the other, life is the basis of protoplasm, their relation to each other being reciprocal." He then goes on to say "Whether with the old writers we speak about consensus, with Treviranus about adaptation, or are content to take organism as our point of departure, it means that, regarding a plant or an animal as an organism, we concern ourselves primarily with its activities or, to use the word which best expresses it, its energies. Now the first thing that strikes us in beginning to think about the activities of an organism is that they are naturally distinguishable into two kinds, according as we consider the action of the whole organism in its relation to the external world or to other organisms, or the action of other parts or organs in their relation to each other. The distinction to which we are thus led between the *internal* and *external* relations of plants and animals has, of course, always existed, but has only lately come into such prominence that it divides biologists, more or less completely, into two camps—on the one hand those who make it their aim to investigate the actions of the organism and its parts by the accepted methods of physics and chemistry, carrying this investigation as far as the conditions under which each process manifests itself will permit; on the other those who interest themselves rather in considering the place which each organism occupies, and the part which it plays in the economy of nature. It is apparent that the two lines

of inquiry, although they equally relate to what the organism *does*, rather than to what it *is*, and, therefore, both have equal right to be included in the one great science of life, or biology, yet lead in directions which are scarcely even parallel. So marked, indeed, is the distinction, that Professor Haeckel some twenty years ago proposed to separate the study of organisms with reference to their place in nature under the designation of 'oecology,' defining it as comprising 'the relations of the animal to its organic as well as to its inorganic environment, particularly its friendly or hostile relations to those animals or plants with which it comes into direct contact.' Whether this term expresses it or not, the distinction is a fundamental one. Whether with the oecologist we regard the organism in relation to the world, or with the physiologist as a wonderful complex of vital energies, the two branches have this in common, that both studies fix their attention, not on stuffed animals, butterflies in cases, or even microscopical sections of the animal or plant body—all of which relate to the framework of life—but on life itself."

The fact pointed out by the President is self-evident, *viz.*, that there are certain relationships existing between animals and the external world, or as he terms them "external" relations, whilst there are certain relationships existing between the organs of the same organism in reference to each other, *i.e.*, "internal" relations, and that we now have biologists who study particularly the relations of organisms to their external surroundings, whilst others are devoted to the study of the relation of the organs themselves to each other. As regards entomology it is doubtful whether oecologists and physiologists are so sharply differentiated as the doctor's remarks would lead us to suppose; it seems almost impossible that anyone can study the oecological side of entomology without, at the same time, studying more or less completely its physiological side; but that in their wider applications the two sides are far enough apart, I think we shall be ready to admit. One other thing we cannot fail to notice, *viz.*, the exclusion from the ranks of biologists proper of the morphologist who confines himself to the study of dried specimens of natural history objects, of the man who simply studies or fixes his attention on "butterflies in cases," and not "on life itself."

Dr. Sanderson then goes on to say: "No seriously-minded person, however, doubts that organised nature, as it now presents itself to us, has become what it is by a process of gradual perfecting or advancement, brought about by the elimination of those organisms which failed to obey the fundamental principle of adaptation which Treviranus indicated. Each step, therefore, in this evolution is a reaction to external influences, the motive of which is essentially the same as that by which from moment to moment the organism governs itself. And the whole process is a necessary outcome of the fact that those organisms are most prosperous which look best after their own welfare. As in that part of biology which deals with the internal relations of the organism, the interest of the individual is in like manner the sole motive by which every energy is guided. We may take what Treviranus called *selfish* adaptation—*Zweckmässigkeit für sich selber*—as a connecting link between the two branches of biological study. Out of this relation springs another, which I need not say was not recognised until after the Darwinian epoch—that, I mean,

which subsists between the two evolutions, that of the race, and that of the individual. Treviranus, no less distinctly than his great contemporary Lamarck, was well aware that the affinities of plants and animals must be estimated according to their developmental value, and consequently that classification must be founded on development; but it occurred to no one what the real link was between descent and development; nor was it, indeed, until several years after the publication of the *Origin* that Haeckel enunciated that 'biogenetic law' according to which the development of any individual organism is but a memory, a recapitulation by the individual of the development of the race—of the process for which Fritz Müller had coined the excellent word 'phylogenesis'; and that each stage of the former is but a transitory reappearance of a bygone epoch in its ancestral history. If, therefore, we are right in regarding ontogenesis as dependent on phylogenesis, the origin of the former must correspond with that of the latter; that is, on the power which the race or the organism at every stage of its existence possesses of profiting by every condition or circumstance for its own advancement."

This being so, the importance of those views of entomology which are sometimes termed speculative, but which are distinctly philosophical in their bearing, is evident. How valuable, then, are the observations made, not only on development as studied in the individual itself, in its own organisation as it were, but also those made upon its developmental changes when considered in relation to its environment. How valuable, also, are all observations made on the variation of individuals according to the differences of their environment! Racial variation, now existent in a species, points to something deeper than the mere superficial difference between the various races; and the plastic condition of some species, compared with closely allied species which are remarkable for their constancy in the same genus, often gives us a clue to the form (in a species) or the species (in a genus) which possesses in the most marked degree the power of "profiting by every condition or circumstance for its own advancement."

The doctor then points out that "biology naturally falls into three divisions," and states that "these are even more sharply distinguished by their methods than by their subjects: namely, Physiology, of which the methods are entirely experimental; Morphology, the science which deals with the forms and structure of plants and animals, and of which it may be said that the body is anatomy, the soul, development; and, finally, Ecology, which uses all the knowledge it can obtain from the other two, but chiefly rests on the exploration of the endless varied phenomena of animal and plant life as they manifest themselves under natural conditions. This last branch of biology—the science which concerns itself with the external relations of plants and animals to each other, and to the past and present conditions of their existence—is by far the most attractive. In it, those qualities of mind which especially distinguish the naturalist find their highest exercise, and it represents more than any other branch, of the subject, what Treviranus termed the 'philosophy of living nature.' Notwithstanding the very general interest which several of its problems excite at the present moment, I do not propose to discuss any of them, but rather to limit myself to the humbler task of showing that the fundamental idea which finds one form of expression in the world of living beings regarded as a whole—

the prevalence of the best—manifests itself with equal distinctness, and plays an equally essential part in the internal relations of the organism in the great science which treats of them—physiology.”

That the oecological view of entomology is rapidly becoming the most attractive none can doubt. The physiological still attracts, and always will attract, many adherents, but the morphological (in its superficial sense) is probably being played out. A certain level has been reached in morphological entomology at which the superficial structures of organs have been used to build up more or less artificial systems of classification, which the continued observation of the last half century has done little to solidify, and which are continually being upset by everyone who approaches the subject on the physiological side. That the oecological branch of the subject should, on such good authority, be considered that in which “those qualities of mind which especially distinguish the naturalist find their highest exercise,” is a circumstance which should encourage those who engage in its study, even though they sometimes be vaguely classed as dreamers and theorists by men who are unable to see any good in philosophical study, observation, or speculation.

There is, towards the end of the President's address, a direct reference to our favourite study. It relates to vision in insects and the action of the compound eye in forming the picture which is transmitted to the optic nerve centre. He says:—“Let me conclude with one more instance of a different kind, which may serve to show how, perhaps, the wonderful ingenuity of contrivance which is displayed in certain organised structures—the eye, the ear, or the organ of voice—may be of no less interest to the physicist than to the physiologist. Johannes Müller, as is well known, explained the compound eye of insects on the theory that an erect picture is formed on the convex retina by the combination of pencils of light, received from different parts of the visual field through the eyelids (ommatidia), directed to them. Years afterwards it was shown that in each eyelet an image is formed which is reversed. Consequently, the mosaic theory of Müller was for a long period discredited on the ground that an erect picture could not be made of “upside-down” images. Lately the subject has been reinvestigated, with the result that the mosaic theory has regained its authority. Professor Exner has proved, photographically, that behind each part of the insect's eye an erect picture is formed of the objects towards which it is directed. There is, therefore, no longer any difficulty in understanding how the whole field of vision is mapped out as consistently as it is imaged on our own retina, with the difference, of course, that the picture is erect. But behind this fact lies a physical question—that of the relation between the erect picture which is photographed, and the optical structure of the crystal cones which produce it—a question which, although we cannot now enter upon it, is quite as interesting as the physiological one.”

“With this history of a theory which, after having been for thirty years disbelieved, has been reinstated by the fortunate combination of methods derived from the two sciences I will conclude. It may serve to show how, though physiology can never become a part of natural philosophy, the questions we have to deal with are cognate. Without forgetting that every phenomenon has to be regarded with reference to its useful purpose in the organism, the aim of the physiologist is not

to enquire into final causes, but to investigate processes. His question is ever *How*, rather than *Why*."

"May I illustrate this by a simple, perhaps too trivial, story, which derives its interest from its having been told of the childhood of one of the greatest natural philosophers of the present century? He was even then possessed by that insatiable curiosity which is the first quality of the investigator, and it is related of him that his habitual question was, 'What is the *go* of it?' and if the answer was unsatisfactory, 'What is the particular *go* of it?' That north-country boy became Professor Clerk Maxwell. The questions he asked are those which in our various ways we are all trying to answer."

Whether the statement, or rather the summary of the learned Doctor exactly states the case with regard to the vision of insects, it is out of place to discuss here, but in the present condition of our knowledge, it is only in the most general way that we can speak of "pictures being formed," or say "the field of vision is being mapped out a consistently as it is imaged on our own retina." So far as our present information goes, vision in insects is of the most general character and the whole area behind the hexagonal facets, including not only the retinal cones at the back but also the semi-fluid material in front appears to be capable of receiving impressions. A keen perception of light and shade, and a distinct idea of masses of colour appear to be the main features of insect vision. Discrimination of individual objects as we know them appears to be impossible to insects by means of sight.

My concluding remark must be one of regret, that among so many entomologists who rear, catch and arrange the beautiful objects they collect, there are still so many who amass collections, to show to their friends, who spend infinite time and labour on breeding insects to possess a series of a certain species in rather finer condition than those of their entomological neighbours, and yet who never want to know the "*go*" of it, and who could not answer a simple question relating to the insects of which so many have passed through their hands.

ON THE LARVA OF ARCTIA CAIA,

With special reference to its correlated variations in Plumage,
Moulting and Hybernation.

By T. A. CHAPMAN, M.D.

A batch of eggs of *A. caia* came into my hands in the summer of 1890 almost accidentally. A bred ♀ was brought to me and I placed her outside on a leaf; looking next morning, she was still there and had laid a batch of eggs. This led me to the experiments, some results of which I here record, which I had for a number of years contemplated making when opportunity offered.

I may note that *caia* ♀ usually remains where she emerges till she has paired, this takes place about midnight, the ♂ leaves, and the ♀ has usually laid a batch of eggs by morning. Being now less heavy and bulky, she is able the next night to take wing, and afterwards lay two or three more batches of eggs. The ♂ certainly pairs again, and I think, from finding last batches of eggs less fertile, that the ♀ does so usually also, after laying one or two batches of eggs.

The observations I contemplated making on the larva of *caia* were to be directed to the number of moults, which were said to vary much

in that species, and were in continuation of those on *Orgyia antiqua*, presented to the Woolhope Club in 1882, and published in the *E. M. M.* in March, 1887, and which elicited a valuable note from Prof. Riley in the May number. I was so far fortunate that I have not only noted variations in the number of moults, but have found also variation both in plumage and habits to be associated with the variation in moulting, and in such a way as to give some hints as to the meaning underlying them. The subject is one that does not appear to have attracted much attention, and I do not recollect seeing any record of observations exactly similar to those I have made on *A. caia*.

One reason why so little has been done in this investigation is, no doubt, its tediousness and inherent difficulty. The closest attention is necessary to make sure of the moulting of any larva. It was the custom of Mr. Hellins, in order to secure an exact record of any particular species, to isolate an individual larva for special observation, but in this research we must have more than this, we must have an exact record of the moultings, &c. not of one larva only but of 50 or 100, or, if possible, of an entire brood; and so much has the difficulty of this been felt, that some of our best observers cannot say what is the number of moults in species of which they have reared large numbers, still less what, if any, variation occurs in connection therewith. I have, however, devised a tolerably simple method of achieving this result, and should hope to see the subject worked out in detail with a number of species, when it is applied by some of our enthusiastic students of larvæ. Until the means of observation are greater, such hypotheses as we may be tempted to form in explanation of the observed facts must be of a very tentative nature. My method is simply as follows:—As soon as some larvæ lay themselves up for moulting the remainder are removed to another jar, which becomes jar 1, the original being now jar 2, and as soon as any in jar 2 have moulted they are moved on to jar 3, and so jar 1 contains larvæ in first skin, feeding; jar 2, in first skin, laid up for moult; jar 3, in second skin, feeding; jar 4, in second skin, laid up for moult, and so on. There may, of course, especially as the larvæ grow, or as varieties of habit appear, be several jars of the same number—thus jar 7, feeding, in fourth skin, may be repeated several times, or be jar 7, jar 7A, jar 7B, according to variation.

It may be well to begin by describing the larva and larval history of what we may take to be normal *caia* under ordinary circumstances.

The eggs are laid in regular hexagonal order in batches of 100 to 300 on any flat surface, the underside of a leaf being the usual site, and like the "ermine" and many *Noctux* that lay their eggs in a similar way, the leaf of a tree or shrub many feet from the ground seems to be often selected, the young larvæ, of course, dropping to the ground amongst the low plants, on which they feed. The eggs are nearly spherical, 1.00 mm. in diameter, creamy or, quite at first, greenish-white, changing colour to an orange creamy in a day or two, but not further till shortly before hatching, when they get very dark chocolate and then black. They have a pearly lustre, and a very delicate transparent appearance, but this is deceptive, as they are tolerably hard and solid, and none of their contents can be seen at all, though their mirror-like surface reflects surrounding objects, and for some time led me to think I was observing some interior structure, although I could not make out what. The surface is mapped out by a very fine network of raised lines, usually in hexagons.

The newly-hatched larva is deep fuscous in the first stage, but soon becomes black or nearly so, the hairs and tubercles being black and obscuring the fusco-rufous skin, till, after feeding, the tubercles separate from each other enough to expose it, and it becomes a larger element in the larval colouring as it grows. This change with growth is even more marked in the three following skins. The larva, at first densely hairy, and taking its general aspect from the colour of the hairs, gradually, with its growth, exposes the intermediate skin and the hairs become a less marked feature, till, when full-grown in each stage, the colouring of the skin, rather than of the tubercles and hairs, gives character to the larva. The length of the larva in the first stage is 2.3 mm., growing to 4 or 5 mm. The head is black, the second segment has a black plate carrying eight hairs beneath its front angle, and in front of the spiracle is a tubercle carrying two hairs, and another lower down carrying one. On segments 3 and 4 are, on either side, a dorsal tubercle carrying two hairs and a sub-dorsal carrying one, these taken together seem to range with the dorsal plate of second segment. Below is a largish tubercle with one hair in line with the pre-spiracular on 2, and a lower one in same line with the lower on 2. On each of these three segments is a small tubercle without a hair, immediately above and behind the pre-spiracular tubercle.

On the following segments 5-12, are a small anterior and a larger posterior trapezoidal tubercle, each with one hair, a large supra-spiracular with two hairs, and a post-spiracular with one. All these are angulated, with sides flattened against each other as if flattened by mutual pressure, precisely as I have noted in the *Acronyctas*. There is also a sub-spiracular tubercle with one hair, and two lower ones less marked and without hairs. The base of the prolegs carries a large tubercle-like plate. The true legs have three chitinous joints, as well as some basal plates, with a curved claw and battledore palpus at the end of the third joint.

The prolegs are of circular shape, expanded at end of a pedicle, with four hooks in inner $\frac{3}{5}$ of the edge; five hooks occur on 9 and 10, at least in some instances.

In one specimen the post-spiracular tubercle on 12 carried two hairs. The thirteenth segment has on either side a large square tubercle with four hairs, and a lower smaller one with one hair. The fourteenth segment carries an anal plate, with six hairs much shorter and smaller than the others, the general hairs being from once to twice the diameter of the larva in length, these on the anal plate about one-third of the diameter. The anal prolegs seem to be of the same structure as the ventral. The hairs are very finely spiculated.

In the second skin the length reaches 5 or 6 mm. The structure and appearance are much as in the previous skin. The tubercles have more hairs, except the anterior trapezoidal, which retains one. The posterior trapezoidals have eight or nine; the supra-spiracular five or six; the sub-spiracular, four; the marginal and ventral, each four; a plate on second segment; two large and one smaller tubercles on each side of 13. The legs preserve the battledore palpus, and the prolegs are now more expanded and flange-shaped, *i.e.*, they have a flat fan-shaped surface directed towards the middle line; this carries four hooks on 7 and 8, five hooks on 9 and 10, placed on the middle portion of the fan, with a margin at each end, as if for more hooks that do not yet exist. Segment 12 has nearly lost the ventral tubercles. Three large

eye-spots can be counted. When full fed there is a pale dorsal line and a pale lateral region; this is characteristic of the full-fed larva in the second, third, and fourth skins.

In the third skin the larva is of similar character, the pale dorsal line and pale lateral region are more evident, and more distinct in tint from the intermediate darker region. The hairs are more numerous, the tubercles being large bosses carrying them stellate fashion, the posterior trapezoidal and supra-spiracular being very large, the others smaller, but each with many hairs; the ventral prolegs have six strong hooks, and an extended flange, as if for more, both before and behind them. The anal prolegs have the same structure. The true legs still carry a large battledore palpus, or a pulvillus.

In the fourth skin the length extends to twelve mm. and the hairs and tubercles are disposed as in the last skin. The supra-spiracular tubercles and those below them tend to have white summits. This is so more or less in all the following skins, and full grown larvæ often have tubercles with a white, silvery sheen. A few of the longer hairs are whitish, and the white dorsal line is more distinct, but varies much in width. The prolegs have 9-11 well developed hooks, and the extended flange beyond is now plainly marked by chitinous lines, plainly the rudiments of 5 or 7 more at either side.

In the fifth skin the hairs are more crowded than previously, and though the dorsal and lateral pale lines are plain enough, they are not (owing to the greater density of the hairs) so obvious as in previous skins. The prolegs have twelve and thirteen hooks, and places for seven or eight on either side, disposed precisely as in the previous skin.

It is in this fifth skin that hybernation takes place. As illustrating the difficulty of dealing with moults, I may say that two good observers both told me that with them the larvæ hybernated in the second skin, but when shown the larva in the fifth skin, said, yes, that was the size in which they hybernated. After hybernation the larva moults three times more, but not unfrequently only twice, probably according to the successful hybernation as regards exhaustion or otherwise, whilst four moults may occur. In all these, however, the larva now has the plumage of the adult larva, that is, long flowing black hairs with whitish tips, paler lateral hairs, and red hairs in the front segments.

For my own convenience I have called this the *caia* plumage (Pl. I., fig. 4; Pl. II., fig. 5). That of the fifth skin, in which the hairs are very dense, of tolerably uniform length, and also of a tolerably uniform tint, rarely much redder in front, I have called the *fuliginosa* plumage, as the larva resembles the full-grown larva of *A. fuliginosa* (Pl. I., figs. 2 and 6; Pl. II., fig. 4), and, like it, the hairy clothing seems adapted to hybernation. The earlier skins, with fewer hairs and the larval skin more in evidence, I have called the *Spilosoma* plumage (Pl. I., figs. 3 and 8; Pl. II., fig. 2).

Whether I was led to the names by the consideration of what these resemblances probably suggested, or whether the suggestion originated with the names, I have not been able to avoid theorising that, in habit, as regards the hybernation of the larva, we begin with *Spilosoma* (*menthastris*), which has a delicate larva, and hybernates as a pupa. A similar delicate larva in *fuliginosa* becomes very hairy and robust in its last skin for hybernation; whilst *caia* goes a step further, and assumes a further and different plumage after hybernation.

(To be continued.)

SCIENTIFIC NOTES & OBSERVATIONS.

NOTES ON THE BREEDING OF *EPHYRA ORBICULARIA*.—A few notes on the extraordinarily short time occupied in breeding this species from egg to imago may be of interest, it being my first experience of so rapid a completion of the life history of a species. The eggs (from New Forest parents) were received by me on the 2nd August last, and were then of a coral red colour. Two days later, namely on Wednesday evening the 4th, as I noticed some of the eggs had commenced to hatch out, I placed them in a large linen sleeve on a willow bush growing here in my garden. The only other protection I gave them was to place a temporary wooden covering above the sleeve to run off rain. Before the end of a week I noticed that the larvæ were growing very rapidly, the latticed green markings showing very clearly, and were quite a quarter of an inch long. They continued to develop at this fast rate until Monday the 14th, when two had changed to dove colour, and had attached themselves to the inside of the sleeve much in the fashion that many butterflies affect in pupation, and as their colour was waning I looked for an early change to the pupal stage. I had not long to wait, as this took place on Wednesday, the 16th, so that the time from hatching out to pupation occupied exactly three weeks. During the following days I removed these two pupæ, with others that had since turned, from the sleeve, and, still keeping them in the garden, I found yesterday, the 10th September, that the first two pupæ were evidently on the point of emergence. I consequently removed them indoors, and was gratified to find towards evening two fine females at rest on the muslin side of the cube-shaped cover that I had placed over the pupæ. The time thus occupied from the egg to the perfect state was exactly 39 days, a "record" as far as my own experience extends. Doubtless the tropical heat of August and an abundance of food were the main causes of hastening on the larval stage of the species under notice.—S. WALKER, 23, Portland Street, York. *September 11th, 1893.*

NOTES ON CERTAIN SPECIES OF *VANESSA*.—*V. atalanta* larvæ have been abundant here from the beginning of June to the present, though not so plentiful in July as in June, August, and September. I brought in a dozen of the smallest I could find one day this week, and have two at least that I think cannot be butterflies before the middle of November, as growth will be retarded when the weather grows colder. As an egg laid on May 4th was a butterfly about July 7th, I cannot consider the present larvæ to be from hibernated butterflies, all of which seemed to disappear early in June. I saw the first fresh *atalanta* on July 4th, and by July 9th they were very common. In July, 1889, *atalanta* larvæ were common; towards the end of that month a friend wrote asking for some, but in the first week of August, though I searched carefully for several days, I could not find one. On September 20th I found one, and on October 6th another not half grown. The former pupated in October, and a perfect butterfly appeared in November; the latter pupated about November 20th, and the imago appeared on December 25th or 26th. I was from home those two days, but found it on the morning of December 27th with crippled wings. *V. io* were on the wing in April this year. Larvæ plentiful in June, after which all were gone. I

saw first fresh butterfly on June 30th, and others on July 2nd. On August 27th I was pleased to find a large brood of larvæ nearly full fed. I brought in 31, all of which pupated about August 30th and 31st, except one, which fed a week longer. All were butterflies on September 15th and 16th, save the belated individual which appeared September 22nd. This is the first time I have seen what I believe to be a second brood of *io*.

There are always two broods of *V. urticae* here. I have in more than one year found larvæ late in September, but could find none this year. On June 25th one flew into our parlour to hybernate. I covered it with a chip box to save it from accident, and have since then looked at it occasionally. It seemed healthy and in unchanged position till the middle of this month, when I found it dead; probably the heat of the lamp was too great for it, as it was near the ceiling. I have often seen *urticae* in winter quarters at the end of July, but never before in June. What could cause it to "hibernate" at Midsummer?

V. cardui larvæ became fairly common here towards the end of July. I reared about a dozen, all of which became butterflies between August 9th and 14th. I saw, however, one apparently quite fresh on Wednesday last, September 27th.—JOHN WOLFE, Skibbereen. *September 30th*, 1893.

PRactical HINTS.

THE MONTH.—During this month the collector will do well if he indulge in a little larva beating. Many of the late feeders will be nearly if not quite full fed, and ready to assume their chrysalis garb, amongst which may be enumerated *Eurymene dolobroraria* on oak or beech; *Selenia illustraria* on oak, beech, birch, &c.; *Amphydasis betularia* on oak, beech, and birch; *Stauropus fagi* on oak, beech, &c.; *Platypteryx falcula* on birch; *P. hamula* on oak; *P. unguicula* on beech, &c.

The collector must not suppose that his season for imagines has yet closed. This is the great month for ivy bloom, which forms almost as great an attraction to moths as do the shallows in the spring. Sometimes the rare *Dasyampa rubiginea* falls to the lot of the collector.

Most of the NOCTURÆ flock to this banquet, and the intoxicating effect of "Ivy honey dew" makes their capture easy. All that is necessary is to tap the ivy into the good old "gamp," and quietly box the captures. They certainly can crawl, but seldom or ever fly. Light now yields many of the late species, amongst which may be mentioned *Himera pennaria*, *Hybernia aurantiaria*, *H. defoliaria*, *Cheimatobia brumata*, *C. boreata* and *Oporabia dilutata*.—J. P. MUTOH.

VARIATION.

GYNANDROUS FIDONIA PINIARIA.—I had the good fortune this year to capture a hermaphrodite *Fidonia piniaria*. Both left wings are those of the female and the left antenna is *simple*; the right wings those of the male and the antenna *pectinated*. Have you heard of the like in this particular moth?—W. P. BLACKBURN-MAZE, Shaw House, Newbury. *September 25th*, 1893.

VARIETY OF *COLIAS EDUSA*.—I was fortunate in securing a remarkable female variety of *Colias edusa* on August 31st, on the cliffs at Milton, Hants. The black band at the border of the wings is divided by a series of light yellow spots, forming almost a complete stripe. I enclose you a drawing of the same.—CHAS. E. MASON, 21, George Street, Cheetham Hill. September 11th, 1893. [A figure of the variety shows the pale spots in the dark border of the fore-wings rather larger than is usually the case, and united to form a band. We have seen others, however, equally strongly marked.—Ed.]

VARIETY OF *COLIAS EDUSA*.—Referring to Plate C in the February number of the *Entomologist's Record* (vars. of *Colias edusa*), I have to record the capture, on August 17th, 1892, of what I consider an interesting variety of *C. edusa*. It had remained unobserved in my store boxes amongst a number of other specimens of that species taken at the same time, but on turning them over to-day, I noticed that the insect in question was decidedly not what I had taken it to be, viz., a male specimen, but undoubtedly a female; but with the exception of a faint spot on left fore wing, there is an entire absence of the usual female markings, and the inner edges of the black margin appear hardly so clearly defined as in the typical form. This insect appears to be quite as distinct a varietal form as those figured on the plate referred to, and I send you the description of it, in case you think it worthy of notice in the *Record*: I should also be pleased to show the insect to any entomologist who cares to see it. I may add that the locality in which it was taken was the South Downs, Hants, in a clover field.—C. COLES, 61, Barrington Road, Brixton, S.W. August 11th, 1893. [This is not at all an uncommon form of the female. In a large exhibit made before the Ent. Society of London last autumn, we noticed two similar females included among the males. Most of the older collectors have similar specimens in their series, and there were several mentioned in our columns last year.—Ed.]

CURRENT NOTES.

Our last "Current Note" (*ante*, p. 248) was rendered ridiculous by a printer's error, the word "pupa" being omitted after "butterfly." The movement of all British butterfly pupæ known to us is lateral, what we wish to learn is whether an anterior and posterior movement ever occurs in any.

Mr. P. Wykman, Scientific Library, 1, Rue de l'Arbre, Brussels, proposes bringing out a re-issue of Hübner's *Sammlung Exotischer Schmetterlinge*. The issue will be confined to 75 copies, and the cost 6s. 8d. per part. Another magazine on general natural history (closely resembling the *British Naturalist* in scope), under the name of *The Naturalist's Journal*, is being published by Messrs. Elliot Stock. Subscription, 2s. 6d. annually. The Hon. Walter Rothschild, deploring the fact that all entomological matter that ought to be printed cannot find its way into the magazines and transactions of societies, intends establishing a magazine for the description of the material in his collection at Tring. Annual subscription, One Guinea.

Lord Walsingham, in the *E. M. M.*, gives another note on *Conchylis (Eupæcilia) implicitana*. We must own that just at present we are in a

hopeless muddle as to which names should be applied to the three allied species—(1) the golden-rod feeder, (2) the *Anthemis* feeder, which used to occur on waste ground in Westcombe Park, (3) the narrower-winged triple-hooded species, rather common on the chalk hills. Lord Walsingham appears to unite the two first as *implicitana* and call the third *erigerana*. That there are three species appears certain.

The Rev. A. Nash records "a very dark variation of *Agrotis puta* at sugar." Is this as usual the ♀ thus designated?

NOTES ON COLLECTING, Etc.

ACHERONTIA ATROPOS AT SEAFORD.—I have to record the capture of a specimen of *Acherontia atropos* on the beach at Seaford, in Sussex, on the 2nd inst. The insect was captured by a boy and taken to my friend, Dr. Evans of Seaford, who is interested in entomology. Several specimens of *Colias edusa* have been seen and taken at Seaford and its neighbourhood this autumn.—HENRY A. HILL, 132, Haverstock Hill, Hampstead, N.W. *September 19th, 1893.*

SATURNIA PAVONIA IN AUGUST.—This is truly a remarkable season so far as the times of appearance of insects are concerned. At the end of August last a male specimen of *Saturnia pavonia* emerged from a pupa, which I thought would have lain over till next spring. The larvæ were taken in 1892 at Tenby, and all the imagines except six emerged in April and May last, one of the said six coming out in August, as above stated.—HENRY A. HILL, 132, Haverstock Hill, Hampstead, N.W. *September 19th, 1893.*

OBBEREA OCULATA AT WICKEN.—I took a fine specimen of this handsome Longicorn at Wicken, on July 28th, on the wing at dusk. Fowler gives no record since 1883.—F. BOUSKELL, Lansdowne Road, Stoneygate, Leicester.

COLIAS EDUSA AT EXMOUTH.—I have found *Colias edusa* very abundant at Exmouth, South Devon, not only on the cliffs, but almost in the town itself, and I was fortunate in capturing four of the light var. *helice*, amongst which was a dark buff specimen with the orange spot on the hind wing of an unusually large size. I have neither seen nor heard of *C. hyale* this year; I heard from a young collector that he had taken three *Vanessa cardui* near Exmouth, but I did not capture the species myself.—ARTHUR KEAYS, Upwood Tower, Caterham Valley.

APPARENT DEARTH OF DIURNI.—Has any suggestion been made as to the probable cause of the extraordinary dearth of Diurni and of larvæ this summer? With regard to the latter, I have been unable to find any in places that last year at about the same time abounded with *Cerura vinula*, *Smerinthus populi*, *Notodonta ziczac*, *Teniocampa stabilis*, *T. gothica*, etc., while the sole result of diligent searching of what were formerly reliable nettle beds, is a solitary *V. atalanta* larva. With regard to Diurni, my experience has been, perhaps, more extraordinary. In the course of three visits to Abbott's Wood I saw perhaps twenty or thirty, of which one was a *Colias edusa* male, and two were *V. atalanta*. On the slope of Beachy Head, which last year swarmed with *Lycæna corydon* and *Satyrus semele*, I have this August seen about half-a-dozen of the former and one of the latter, during three visits, two of which were early in August, and one late in that month. On August 20th,

which was bright and hot, I walked in the morning, with two friends, from Clapton, through Wood Street to Chingford, rambling in all directions through the Forest, and beating bushes for Micros. We saw absolutely nothing! The 26th and 27th of August I spent at Oxshott. Here I saw a few *Ctenonympha pamphilus*, and a friend caught a battered *Vanessa atalanta*, but the only captures I made during the day were a few Micros. By-the-way, I know of three cases of *Smerinthus populi*, and one of *S. ocellatus* emerging this autumn, reared from ova laid in the spring. I suppose that is attributable to the weather.—W. W. ESAM, Eagle House, St. Leonards. September 30th, 1893. [Our experience this season has certainly not been in the direction suggested by our correspondent. True, larvæ have not been common this year as about “the same time last year,” but were even in greater abundance at an earlier period. In the New Forest in June, larvæ usually taken in late July and August were beaten in hundreds, and full-fed at that time. *Vanessa* larvæ, which should normally be looked for in July, had at that time already disclosed imagines. We bred *c-album*, *urticæ*, *polychloros*, *atalanta* and *io* before the end of June, and a second brood of all these species again during the last four weeks. *Lycæna bellargus* was over in May and a second brood out in middle of July, whilst *L. corydon* was occurring freely in Kent in the middle of June. This species would have been nearly over, we should think, this year in August, when our correspondent went for them. Does not he explain, too, the absence of the larvæ of *Smerinthus populi* this autumn, when he records the occurrence of a second brood of imagines at the time when larvæ normally occur?—Ed.]

COLEOPTERA IN THE HASTINGS DISTRICT DURING SEPTEMBER.—Since September 7th I have devoted a great deal of time to Coleoptera, with the following results. Those I have marked with an asterisk * are new to our district list. At Guestling, among dead leaves, refuse heaps, &c. I have taken *Euryporus picipes*, 5; *Megacronus inclinans*,* 1; *Habrocerus capillaricornis*, in numbers; *Lithocharis brunnea*, 40 or 50; *Quedius picipes*, common; *Q. peltatus*, *Q. cruentus*, reared; *Philonthus carbonarius*, 1; *Othius myrmecophilus*, common; *Megarctus sinuaticollis*,* reared; *M. hemipterus*, about a dozen in fungi; *Leistotrophus nebulosus*, in fungi; *Homalium punctipenne*, a few under bark; *Choleva wilkini*, abundant; *C. kirbyi*,* 2; *C. velox*, occasional; *Agathidium atrum*, *A. nigrinum*, *A. convexum*,* *A. varians*, a few of each; *A. lævigatum*, a series; *Amphicyllis globus*, a small series, including one var. *ferrugineum*; *Anisotoma badia*, 1; *Cephennium thoracicum*, reared; *Alexia pilifera*, common on one occasion only; *Lycoperdina bovisæ*, 1; *Coccinella 16-guttata*, reared; *Trachodes hispidus*, 1; *Liosomus oblongulus*, rare; *Acalles pitinoides*, a small series; *Cænopsis waltoni*, reared; *Conispora orbiculata*, reared; *Bradycellus distinctus*, abundant; and many common species: the above are the results of four days' collecting. At Hollington, *Epurea longula*,* a single example; *Apteropeda globosa*, 2, among dead leaves; *Galerucella viburni*, a few; *Chilocorus renipustulatus*, a few by beating; and plenty of commoner species, as well as a few of the above (*L. brunnea*, &c.). At Maplehurst Wood, *Epurea parvula*, beaten from faggots; *Bembidium mannerheimi*, &c., among dead leaves; such common insects as *Lathrobium brunnipes*, &c., were abundant on this occasion. Ore Woods produced, among many others, a few *Conurus immaculatus*, *Metabletus obscuroguttatus*, &c., among dead leaves. On

the banks of a reservoir near the town, *Tachyusa constricta*, reared; *Stenus guttula*, *S. bipunctatus*, abundant; and swarms of common *Bembidii*.

I have still a number of undetermined species of *Homalota*, *Oxypoda*, *Aleochara*, *Scydmanidae*, &c., which I hope to work out during the winter, taken at the above localities.—A. FORD, Glen Mount, Braybrooke Road, Hastings. October 2nd, 1893.

CALLIMORPHA HERA IN SOUTH DEVON.—I had three days after *Callimorpha hera* in South Devon and netted five, all hens, and now I have a promising family party feeding on lettuce, but I was rather late for them, and my specimens are sadly worn and, worse still, had laid most of their eggs. I got two of the yellow variety.—E. A. BOWLES. August 28th, 1893.

EUBOLIA PERIBOLATA.—In addition to my captures in Guernsey enumerated last month, I was successful in taking a good series of the very pretty little Geometer, *Eubolia peribolata*, which seems generally distributed here, but local only as regards abundance. I found it on September 2nd on Delancey Hill, and on the 4th at Moulin Huet Bay; it is very easily disturbed from the common furze (*Ulex europæus*), which is, I believe, its food plant.—ALBERT J. HODGES, Guernsey. September 5th, 1893.

COLEOPTERA AT SUDBURY LAST MAY.—As I had already had a very successful hunt in this locality in January, I paid it another visit in May, with the hope of getting some of the summer insects, and took my net for sweeping the hedgerows, but before I came to any hedgerows worth sweeping, I noticed a half dried-up pond in a field by the road side, so I got over to see if any insects were to be obtained, as I had found beetle life in superabundance at Hendon, a few Saturdays back, in a similar situation.

The first thing I saw was a small "Staph" running over the mud, so I got it in a phial to examine, and discovered it to be *Tachyusa concolor*, a species only taken in the London district and always looked upon as a rarity. It is unfortunately one of those species which go rotten very quickly in the laurel bottle, so I only took between forty and fifty, but could easily have secured double that number. *Tachyusa flavitarsis* was equally abundant, and amongst the other "staphs" taken were *Philonthus atratus*, *P. quisquiliarius* var. *dimidiatus*, *P. procerulus*, *Lathrobium quadratum*, *Trogophloeus pusillus*, and heaps of the commoner *Steni*.

The ground beetles were also in considerable numbers. I took seven *Dyschirius ceneus* (one of which was quite black), and *Anchomenus viduus*, and the var. *mæstus*, *A. fuliginosus*, *A. piceus*, *Chlænien nigricornis*, *Bembidium femoratum*, *B. bruxellense*, *B. lampros* var. *velox*, *B. varium*, *B. flammulatum*, *B. articulatum* and *B. 4-maculatum*, were all more or less common.

On the banks of a stream (the river Brent, I suppose,) about a dozen yards from the pond, I found *Anchomenus oblongus*, *Bembidium bipunctatum*, *Deleaster dichrous* and *Ceuthorhynchus viridipennis*. As might be well imagined, I did not do much sweeping, the only insect worth mentioning being *Phyllotreta ochripes*, of which I took a series from *Erysimum alliaria*.—H. HEASLER, 17, Danby Street, Peckham.

NEWSPAPER ENTOMOLOGY.—Under the head of "Rural Notes," the following article appeared in the *Graphic* for September 9th, and will no doubt convey some new ideas to entomologists:—

"SUMMER BUTTERFLIES.—This has been a great season for butterflies. Fritillaries were both early and numerous, and there were plenty of good takes as near London as Epping Forest and West Wickham. The beautiful *edusa* has not been nearly so common as last year, except on the North Devon coast from Clovelly to Minehead. Here it has been taken freely, and also a specimen or two of *heliéc*, a very rare "bleached" variety, claimed by some as a separate species. The Spurge Hawk moth has been taken in Devon and Cornwall, while the *atalanta* butterfly appears to be, this season, more common than the small tortoiseshell. As the caterpillars of each sort feed on the nettle, the extreme frequency of the one imago, and the comparative infrequency of the other are worthy of note. The small copper butterfly is now, perhaps, the commonest denizen of the open common, but we seem to find, year by year, fewer and fewer hair-streaks, while the common Tiger moth is certainly far less common than it was ten years ago. The Black-veined White, the Mazarine Blue, and the Wood White are practically extinct; but we have to set against this more frequent takes of *antiope*, of the Convolvulus Hawk Moth, and of the Clifton Nonpareil. It is, on the whole, a most difficult thing to say if butterflies and moths are becoming scarcer or not. The growth of towns and the eagerness of collectors tell against them; but the destruction of birds is in their favour, and so is the decline of agriculture, and the extending area of neglected land and unoccupied farms."

Possibly, they may not be aware that the ♀ var. *heliéc*, or "bleached" variety of *edusa*, is considered by some a separate species. Jumping from the "Spurge Hawk Moth" to "*atalanta*," on to the "small tortoiseshell and copper," we are informed that "Hair-streaks" seem to get fewer and fewer, and that the "Tiger Moth is less common than formerly." My experience of the last few years does not enable me to agree with the writer, and I must differ again from him when he states that the "Wood White is practically extinct," for I know of seven or eight localities, in this county alone, where it can be taken in abundance, and in certain seasons a second brood may be found. The "eagerness" of collectors can hardly be responsible for insects becoming scarcer. Man, it has been calculated, stands tenth on the list of "enemies," and the deficiency caused by his destructiveness is partly compensated by artificial breeding and rearing.—JOHN N. STILL, Bridestowe, Devon. [It is really time that high-class papers should refuse such nonsense as the above, but it only shows how ignorant certain so-called literary people are, and the tendency of the age to make believe that one can know and deal with every subject under the sun. An issue of the *Star* was sent to us a few weeks since, in which was a rude cut of a beetle, with some amazing information, given by an authority at the British Museum, but digested by the *Star* man and written from his point of view. One statement was to the effect that the beetle had "a long ovipositor," by means of which "the larvæ" were deposited in the holes of trees.—ED.]

ERRATUM.—Page 254, line 33, for "*margœatus*" read "*marginatus*."

NOTES OF THE SEASON.

Summer Collecting in North Kent.—Following up my notes in the last issue, July 6th at Cuxton gave me a splendid day's work. The day was

brilliant and insects swarmed. It was purely a matter of how many one could catch against time. I did not get on the ground until 11 a.m., and caught a train back to Strood at 4.12 p.m., fretting and fuming that I had filled all my boxes. I had a regular field day with *Ilithya carnella* and *E. anguinalis*, securing about 60 fine specimens of each species, whilst the second broods of *Acidalia ornata*, *Pyrausta punicealis*, and *P. purpuralis*, as well as *Eubolia bipunctaria*, would have given me equal numbers could I have housed them; but coming on a brood of *Mimæseoptilus zophodactylus*, it took me some time to see, capture and box a dozen, all three operations being equally difficult with this lively customer. *Aciptilia baliodactyla* and *A. tetradactyla* still received careful attention, whilst *Phycis subornatella*, *Phytometra ænea*, *Lithosia complana*, and another fine *Sesia ichneumoniformis* again turned up. Among other things I find I captured *L. ægon*, *Aspilates gilvaria*, *Leucania conigera*, *H. cespitalis*, *Scoparia dubitalis*, *Gelechia cinerella*, *P. aspersana*, *B. fuscocuprella*, *Pancalia leuwenhoeckella*, *Stigmonota composana*, *C. dilucidana*, *Eupæcilia erigerana*, *P. aspersana*, *Sericoris conchana*, *C. tessera* and *P. sellana*, only a few of each, in most cases through want of boxes, although in some because they were rare, as in the case of *dilucidana*, *composana* and *sellana*. July 8th saw me at the same locality, though there were great changes in the atmospheric conditions. Rain and a high wind kept matters in an unsatisfactory state, and a heavy thunderstorm about 5 p.m. drove me off the ground. My captures, however, were not uninteresting. Besides *I. carnella*, *E. anguinalis*, *P. punicealis*, *P. purpuralis*, *H. cespitalis*, *M. zophodactylus*, *A. baliodactyla*, and others in lesser numbers, I took a few fine specimens of the second broods of *Ematurga atomaria*, *Nisoniades tages* and *Eriopsela fractifasciana*, whilst *Catoptria cana*, *C. cæcimaculana*, *Sophronia parenthesella*, *Depressaria nanatella*, *Gelechia subocella*, *Orthotania striana* and *Edematophorus lithodactyla* were added to the previous captures. The latter species is quite new to me on the chalk hills. *Leucania lithargyria* was disturbed frequently during the morning, and *Macroglossa stellatarum* fought manfully against the wind at the flowers of the bugloss. The next week was a blank. A dull, miserable Saturday, with lively recollections of the thunderstorm of the 8th, in which I got well soaked, kept me in London; but I went to Cuxton again on July 22nd in company with Mr. Page. *Anaitis plagiata*, *Eubolia bipunctaria* and *Acidalia ornata* were exceedingly abundant, whilst *E. mensuraria*, *Aspilates gilvaria* and the second brood of *Ematurga atomaria* were almost equally so. Among the butterflies second broods of *Lycæna bellargus*, *L. icarus*, *L. medon*, *Chrysophanus phlæas*, *Nisoniades tages* and *Pararge megæra* appeared frequently, whilst *L. corydon* and *P. linea* were by no means rare. *Acontia luctuosa* turned up, but *I. carnella* was getting over. The second brood of *Melanippe sociata* occurred, and I had a rare day with the *Pterophorina*. *A. baliodactyla* came first, then *A. tetradactyla*. Besides these *Mimæseoptilus bipunctidactyla*, *M. zophodactylus*, *Pterophorus monodactyla*, *Ce. lithodactyla* (one), *Oxyptilus parvidactyla* and *Leioptilus osteodactyla* were all netted, whilst *Aciptilia pentadactyla* and *M. pterodactyla* were observed. A fine series of *Coleophora ochrea* and *C. lizella* fell to my net, as also some twenty specimens of *Eupæcilia erigerana*. Besides these *Phytometra ænea*, *S. conchana*, *Gelechia cinerella*, *Pyrausta punicealis*, *P. purpuralis*, *H. cespitalis*, *E. anguinalis*, *S. parenthesella*, *Eupithecia*

centaureata, *Grapholitha nigromaculana*, *C. teniolella*, *P. aspersana*, *Gelechia anthyllidella*, *C. cana*, *G. sequax*, *Eupœcilia angustana*, *C. dilucidana* were all rather abundant. *E. hybridellana*, *Cemiostoma lotella* and *Tinea arcella* put in a first appearance. *M. stellatarum* still haunted the bugloss flowers, whilst *Zygæna filipendulæ* hung in hundreds all over the hills. *Pyrameis atalanta*, *V. urticæ* and the usual common butterflies were also observed.

This finished my observations and captures up till the end of the month and to my usual summer holidays. I have only once been in North Kent since, on August 22nd, when I again visited Cuxton. A perfect gale was blowing and swept the sides of the hills, but there was then a large number of *Lycæna bellargus* to be seen, some very much worn, with *L. alexis*, *Cemonympha pamphilus*, *C. phlæas*, and *Hesparia comma*, with a specimen or two each of *Aspilates gilvaria*, *Crambus tristellus* and *Pyrausta purpuralis*, probably a third brood, but there were no small species to be seen as the wind was much too powerful. I have not been since, so cannot tell how the autumnal work is proceeding. To those with unlimited time and leisure the above may seem a very commonplace result for the expenditure of so much energy, but as a result for comparison with the work of other years it may prove useful.—J. W. Turr. August, 1893.

Lanark.—Insects have been a month earlier and far more plentiful this year than usual in this part of Scotland. Generally it is a rare thing to see any species of butterfly. This year *Pieris rapæ* and *P. napi* have been common; and now *Vanessa urticæ*, and even *Vanessa atalanta*, are quite plentiful, though I have not seen the latter at all here during the past three years that I have been here. I have also seen a specimen of *Chrysophanus phlæas*, one or two *Pieris brassicæ*, and even one or two *Polyommatus alexis*, which I have never before seen here. I hear that this species has been also seen this year in Berwickshire. During the very hot weather in the middle of August many *Charcæas graminis* and *Hydrœcia nictitans* flew into the castle to light, and I obtained one very nice variety of the former, the ordinary stigmatised linear markings uniting to form a long, triangular, pale blotch. On July 14th I saw a specimen of *Macroglossa stellatarum*, which I have not before seen here. *Carsia imbutata* was either much more scarce than usual this year, or else it was nearly over when I reached these parts (July) as I only took two or three specimens. Sugar is usually a failure here, but this year insects have been plentiful on the bait. On August 11th I took at sugar *Celæna haworthii* (8), *Hadena proteus*, *Xylophasia polyodon*, *Triphæna pronuba*, *Hydrœcia nictitans*, *Cosmia trapezina*, *Noctua glareosa* and *Noctua rubi*. I also on this occasion found several *Celæna haworthii* at rest on the rushes after dark. On August 18th sugar produced most of the foregoing, but curiously enough there were no *haworthii* either at sugar or on the rushes, though the species had been pretty common the week before. However, *Tapinostola fulva* had now taken its place, and swarmed on the rushes. August 25th, on a chilly night, with a cold wind and the moon inclined to show, I thought it would be almost a waste of labour to sugar; but resolved to try, and found myself justified in the event, for the night turned out the best I have had. *Hadena proteus* swarmed on the sugar, some of the forms being very nice. I took all the insects that I had taken before at sugar, and now *Agriopis aprilina* appeared quite commonly, and three *C. haworthii* turned up

again. Twice *Polia chi* has put in an appearance at sugar, usually it entirely ignores such sweets, though occurring very commonly here. I have only met with one dark variety of this species this year. Is this owing to the dryness of the season? Besides the above-named species, I have also taken *Larentia didymata*, *Coremia propugnata*, *Cidaria russata*, *Cidaria pyraliata* and *Cidaria populata*.—(Rev.) J. A. MACKONCHIE, Douglas Castle, Lanark. September 6th, 1893.

Sandown, I. W.—While my enterprising friend, Mr. A. J. Hodges, makes us pretty well acquainted with the lepidopterous fauna of the Western end of the Isle of Wight, we do not so often observe records from the Sandown district. I spent seven weeks there this summer, between July 15th and September 2nd, and as I managed to turn up a few good insects, some notes from the locality may not be altogether without interest. On my arrival I soon found that the early season had robbed me of some of my favourite summer species, such as *Geometra vernaria*, *Melanippe unangulata*, *M. rivata*, *Anticlea rubidata*, and others, which were nearly or quite over, and were not obliging enough, so far as I could discover, to yield second broods. In fact, work among the Geometers was to a large extent a failure, though *Gnophos obscuraria*, and *Aspilates ochrearia* (second brood) were perhaps commoner than usual. I was also pleased to meet with a second brood of *Acidalia subsericeata* for the first time since 1889, and in fair numbers, though restricted to a very limited locality, except one or two wanderers which visited my sugar, in company with an occasional *Acidalia marginipunctata*. *Eupithecia* were represented only by *E. succenturiata* (two only, and a few ova and larvæ), *E. subfulvata*, larvæ of *E. pimpinellata* and a few other very common species; *E. pumilata* was pretty common, the third brood being out early in August and continuing until I left the Island; *E. coronata*, which is usually to be had at Sandown, was an absentee. Larvæ of *Emmelesia alchemillata* were common in flowers and seeds of *Galeopsis tetrahit*, wherever these were observed, but no trace of them was to be found in *G. ladanum*, which abounded in one cornfield, though the larvæ took readily to this when it was offered them. An odd specimen of *E. affinitata*, which turned up in very fair condition on August 2nd, must surely have belonged to a second brood. A few other Geometræ taken may be just briefly enumerated:—*Epione apiciaria* (sparingly), *Cidaria testata* (larvæ on shallows by night; I have never beaten this larva in the day, though frequently beating the shallows among which it occurs), *Ligdia adustata* (larvæ common on spindle), *Phibalapteryx vitalbata* (second brood already getting worn on July 15th, about three weeks early), *Eubolia bipunctaria* (in swarms, and in good condition throughout a great part of the seven weeks), and the usual common "waves" and "carpets," etc.

With regard to the butterflies, the second broods of *Lycæna argiolus* and *Pararge megæra* (if this was not a third brood) were well out on my arrival on July 15th, and were soon followed by *L. bellargus*, which, by the way, reappeared in some of its old haunts near Sandown and Brading after an absence of some years, as well as occurring in its usual abundance at Ventnor. *L. corydon* was to be had in good condition throughout the seven weeks, and a few nice underside varieties were picked out. *Satyrus semele* was not uncommon on Bembridge Down, but *Melanargia galatea* was quite over. *Colias edusa* was much less common than last year, though more so than in years preceding.

There was a very full second brood of *Nisoniades tages*, but some of the species which are reputed to be double brooded in favourable seasons—for example, the two small species of *Argynnis*—were not observed. Of *Vanessa cardui*, generally common at Sandown, only two or three were seen, and *V. io* was almost entirely absent.

I sugared pretty regularly, with fairly satisfactory results on the whole, though fluctuating. I had the good fortune to take two *Leucania albipuncta*, one on July 27th, the other on August 9th; and a good specimen of *Caradrina superstes* on August 15th. Another unexpected visitor was a specimen of *Catocala sponsa* on the chalk downs on July 22nd; where it came from I am at a loss to imagine. *Agrotis lunigera* was nearly over, owing to the abnormal season, and hardly a dozen specimens worth setting were taken; but *A. puta* and *A. nigricans* were abundant and in fine condition, with several *A. tritici* (usually rare at Sandown, and quite absent last year). Other visitors to the sugar during July were *Leucania conigera*, *L. lithargyria*, *Miana literosa*, *M. bicoloria*, *Caradrina taraxaci*, *C. quadripunctata*, *Agrotis suffusa*, *A. segetum*, *Triphæna fimbria*, *T. comes* (abundant), *T. ianthina*, *Amphipyra tragopoginis*, and others, all on the Culvor Downs; *Hydræcia paludis*, *Noctua baia*, *N. rubi*, *Thyatyra derasa*, *Cosmia affinis*, *Gonoptera libatrix* and others, in and near a copse on the marshes. Many of these species continued into August, and were joined by *Cerigo matura*, *Leucania pallens* (second brood), *Triphæna interjecta* (one only), *Agrotis saucia*, *A. exclamationis* (second brood), *Hydræcia nictitans* (one only), etc., on the Downs; and *Noctua plecta*, *Amphipyra pyramidea*, *Mania maura*, *Hadena dissimilis* (second brood, a nice little series), *Zonosoma punctaria* (second brood, one only) etc., in the copse. But towards the middle of August there was a temporary falling off, and after this I did not work the marshes, as the coveted *Aporophyla australis* was daily expected, and *Agrotis saucia* was on the increase. The first *australis* was taken on August 24th, but unfortunately the species was not fully out when I had to return to London on September 2nd. *Bryophila muralis* first appeared on August 15th (very late), *Xanthia circellaris* on August 29th; *Anchocelis lunosa*, common the two previous autumns, had not appeared when I left. *Agrotis segetum* was a pest the last few weeks. A few larvæ of *Aspilates ochrearia* came up to feed on my sugared *Centaurea scabiosa* flowers in July.

With the SPHINGES and BOMBYCES very little was done, though odd specimens of the following were turned up by day:—*Macroglossa stellatarum*, *Sesia ichneumoniformis*, *Nudaria mundana*, *Lithosia lurideola*, *Calligenia miniata*, etc. Several *Hepialus sylvinus* were taken at rest by night. A good deal of fallow beating for larvæ of *Smerinthus ocellatus*, *Dicranura furcula*, and *Notodonta ziczac* (obtained last year), resulted only in three of the last named and none of the others; probably *ocellatus* had already gone into pupa before I commenced working; but this does not seem to be a good season for larvæ. I saw no trace of *Lobophora sexalisata*, which is usually fairly common. Many of the fallow bushes were, however, eaten almost to shreds (as usual) by the larvæ of *Phalera bucephala*.

I do not know whether *Spilodes verticalis* (*cinctalis*) is generally double-brooded; I never saw a second brood till this August, when some six or eight were taken, some in lovely condition.

I think the great drawback to collecting this season has been the

difficulty in fixing the right dates to go for any particular species; but in spite of this, I am by no means dissatisfied with the results of my summer holiday.—LOUIS B. PROUT, 12, Greenwood Road, Dalston.

Rugeley.—I have pleasure in recording the capture of four specimens of *Vanessa c-album* here last week. I do not think this insect has been taken in this district before.—BASIL BURNETT, Park House, near Rugeley, Staffs. September 15th, 1893.

Somerset.—*Colias edusa* has appeared sparingly, the first I saw being on 25th June. *Argynnis paphia* has occurred in several strange localities, sometimes far from a wood. *Macroglossa stellatarum* has been very abundant. Near Axminster (Devon), on 2nd September, I saw numerous specimens of *C. edusa*.—W. MACMILLAN, Ochiltree House, Castle Cary.

Folkestone and Boxhill.—Insects have not been so common as one would imagine; I think the very dry spring had a great deal to do with it, many pupæ having dried up. A second brood of *Thanaos tages* was well out at Box Hill yesterday, and I was astonished the time the first brood was about. I saw several, of course in very bad condition, at Folkestone on July 7th; also several *Colias edusa* and one variety *helice* during that week. It was rather late for *Sesia ichneumoniformis*, and I only discovered the spot when they were nearly over. I took the second brood of *Acidalia ornata* on July 7th. *Tapinostola bondii* was very plentiful, but getting over. I managed to obtain a series, however, but had to take a large number, and pick them over.—A. J. CROKER. August 7th, 1893.

Monkswood.—The season has not been so favourable a one as we were expecting from the bright outlook at the beginning of the year. I was particularly struck at the commencement of this month, while collecting for a few days at Monkswood, at the excessive scarcity of even common insects. A few *Thecla pruni* and *T. betulæ* were taken in the daytime, and *Catocala nupta*, *Mania maura*, *Cosmia diffinis*, *C. affinis*, *Noctua xanthographa*, *Triphena ianthina*, *T. pronuba*, *X. polyodon*, etc., at sugar; but the *Micros* were conspicuous by their absence. I beat the bushes nearly all day, but got absolutely nothing.—GEORGE W. BALDING, Ruby Street, Wisbeach. August 9th, 1893.

Wicken Fen.—After the not very successful records from Wicken this year, it was with some trepidation that I made my first visit there, from July 27th to the 31st, accompanied by Mr. A. M. Corali, but I think on the whole we had as good luck as most collectors during one of the worst seasons there on record. Day collecting produced *Papilio machaon* (second brood) in fair numbers, although they were getting worn. We also secured about 100 larvæ in all stages, some nearly full fed, and a nice lot of ova. The eggs were laid on the wild carrot, as a rule one or two on the underside of a leaf, but on one leaf we found 14 eggs. *Gonepteryx rhamni*, *Pararge megæra*, *Chrysophanus phlæas* were the only *Diurni* we met with. We took a few nearly full fed larvæ of *Viminia venosa*, also a white variety of the larva of *Smerinthus ocellatus*, and a similar variety of *Notodonta ziczac*, both off the white aspen, an excellent example of protective coloration. I took a number of Coleoptera, the best capture being that rare Longicorn *Oberea oculata*, captured on the wing at dusk. I hope to give a full list of the captured Coleoptera another time. Mr. Albert Houghton supplied us with sugar and light apparatus, and the following is the result of the four nights'

work in the fens at sugar:—*Tapinostola hellmanni* (4), *Leucania pudorina* (1), *Calamia phragmitidis* (24), *L. lithargyria*, *L. pallens*, *L. impura* (common), *Cænobia rufa* (1), *Cerigo cytherea* (4), *Helotropha leucostigma* (swarms), banded variety (8), *Agrotis nigricans* (common), *Triphæna interjecta* (2). Sugar on the trees in the lane outside the fen produced *N. hellmanni* (1), *C. phragmitidis* (2), *L. griseola* (6), *Cuspidia psi* (1), a fresh specimen, evidently of a second brood, *L. pallens*, *L. impura*, *L. lithargyria*, *Noctua umbrosa* (2), *N. rubi*, *N. festiva*, *N. baia*, *N. xanthographa*, *N. augur*, *Miana literosa* (1), *M. strigilis*, *A. nigricans*, *A. segetum*, *A. exclamationis*, *T. pronuba*, *T. orbona*, *T. interjecta*, *T. ianthina* (1), *Caradrina blanda*, *C. morpheus*, *C. cubicularis* (2), *H. fibrosa*, *C. cytherea*, *Culymnia affinis* (2), *C. diffinis* (14), *A. tragopoginis*, *M. typica*, *M. maura*, *C. nupta* (1). Light in the fen was a failure except on the 29th, which was a warm showery night with a slight S.W. wind. On that night we took *V. venosa* (2), *N. hellmanni* (2), *C. rufa* (3), *C. phragmitidis* (4), *L. griseola* (1), *L. impura*, *L. pallens*, *A. fibrosa*, *Epione apiciaria* (8), *Acidalia inornata* (1), *Eupithecia nanata* (1), (? Ed.) *Phibalapteryx lignata* (1), *Earias chlorana* (1), *Chilo phragmitellus* (6), besides doing well at sugar, which amply repaid us for our wetting. Dusking only produced *E. apiciaria*, *C. testata*, *C. populata*, *H. elutata*, and a few other common specimens.—FRANK BOUSKELL, Lansdowne Road, Stoneysgate, Leicester.

Sherwood Forest.—This year again has been a good one for *Cosmia paleacea*. I began this year rather later than last, on the 29th of August, my companion as last year being the Rev. W. Beecher, of Wellow. Putting up at Edwinstowe, we sugared over the old track, also trying a fresh ground, and were agreeably surprised to see this insect in considerable numbers, two and three being on one tree, and all were in excellent condition, evidently just out. We also took *Noctua c-nigrum*, and many others.—W. A. B. FERRIS, St. Matthew's Vicarage, Nottingham.

SOCIETIES.

SOUTH LONDON ENTOMOLOGICAL SOCIETY.—September 14th, 1893.—Mr. Auld exhibited living larvæ of *Phorodesma smaragdaria*, Fb., also two breeding cages for larvæ, as described in the *Entomologist's Monthly Magazine* for July last by Mr. H. G. Knaggs. Mr. South showed a fine series of *Spilosoma lubricipeda* vars. *zatima*, Cr. and *radiata*, St., a splendid var. of *Argynnis euphrosyne*, L., taken in Lancashire, a pale var. of *Vanessa urticae*, L., from Monmouthshire, a bluish specimen of *Procris statice*, L., and a number of *Zygæna trifolii*, Esp., including almost all the known forms. Mr. Tutt mentioned that in a locality in North Kent where all the specimens used to be typical five-spotted *trifolii*, out of about two hundred specimens of this insect taken last year (1892), five specimens only had five spots, the remainder having a tendency to assume a six-spotted form, these in most cases having the sixth spot ill-developed, but in many instances the spots were well marked and similar to those of *Z. filipendula*, L.; he also doubted whether the six-spotted specimens captured in May, and recorded as *filipendula* were really that species. Mr. Weir remarked that these two species do occasionally cross in a state of nature. Mr. Fenn exhibited long series

of *Spilosoma lubricipeda* var. *radiata*, St., bred from ova received from Mr. Tugwell, *Gnophos obscurata*, Hb., from Folkestone, and *Macaria notata*, L., bred from ova. Mr. Fenn also exhibited *Selenia lunaria*, Schiff., and read a note thereon. Mr. R. Adkin exhibited a series of *Thecla betulæ*, L., and read a note with reference to the order of sexual emergence. He also showed a short series of *Pygæa pigra*, Hufn. (*reclusa*, Fb.) bred from larvæ taken in Sutherlandshire last autumn. Mr. Jenner Weir read a note, in which he stated that in a recent tour in Belgium he had seen no *Colias hyalæ*, L., and but one *C. edusa*, Fb. He also stated how exceedingly abundant the third brood of *Polyommatus phlæas*, L. had been in his garden at Beckenham this September. Mr. Tutt gave his experience of a day amongst the lepidoptera in the suburbs of Paris at the beginning of August, when *Colias hyalæ*, L. was abundant, with *Agrophila sulphuralis*, L., *Acontia luctuosa*, Esp. and many other species occurring rather freely. Mr. Enock exhibited wheat stems containing pupæ of the Hessian fly from Sidmouth, where he found it infesting the wheat and barley; also examples of *Chlorops tæniopus*, the destructive ribbon-footed corn fly.

September 28th, 1893.—Mr. South exhibited, on behalf of Mr. Sabine, some fine varieties of *Polyommatus phlæas* L. from Dartford, one being intermediate between the type and the var. *schmidtii*, some of the others being very dark. Mr. Frohawk exhibited two boxes of *Polyommatus phlæas*, L. from Balham, &c., showing great variation in size and markings, two approaching the var. *schmidtii*, and two without copper bands on the secondaries; also a living pupa of *Argynnis paphia* L., and a nearly full-grown larva of *Argynnis adippe*, L., these two latter exhibits being a result of the phenomenally fine and hot weather. Mr. Jäger showed six specimens of *Lycæna arion*, L., captured by Mr. Bignell in Cornwall last June. Mr. Fenn exhibited a series of *Dasy-campa rubiginea* Fb., bred September, 1893, from Devonshire, also long and variable series of *Acidalia aversata*, L., *Acronycta rumicis*, L., and interesting varieties of other species. Mr. J. H. Carpenter exhibited a second brood of *Argynnis euphrosyne*, L., the larvæ, after apparently commencing to hibernate, having rapidly fed up during August. Mr. R. Adkin exhibited a series of *Cymatophora duplicis*, L., taken in Sutherlandshire, they being very dark compared with the Southern forms. A paper by Mr. F. W. Hawes was then read "On the unusual abundance of *Polyommatus phlæas* in 1893," in which he reviewed the early appearance of this species in April, and its gradual numerical increase during the succeeding months, also noting some interesting points in its life history, the paper being illustrated by the exhibition of two plants of *Rumex acetosa*, having thereon a number of ova laid in a state of nature, some few of which had recently hatched.—H. WILLIAMS, Hon. Sec.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—Tuesday, September 19th, 1893.—Exhibits:—Mr. Hockett, a smoky var. of *Arctia caia*, a partly silvery specimen of *Polyommatus phlæas*, and bred series of *Angerona prunaria*, *Boarmia repandata*, *Numeria pulveraria* and *Pericallia syringaria*. He stated that the specimen of *Arctia caia* was one of a second brood, and that some pupæ that failed to emerge were found upon examination to include several dark and pale varieties. Mr. Clark, bred specimens of *Cerura vinula*, including a specimen with a pale patch around the discoidal spots on the forewings. Dr. Sequeira,

a large number of insects from the New Forest, including *Lithosia quadra*, *Nemoria viridata*, *Scotosia undulata*, *Aventia flexula*, *Crambus sylvellus*, and many others. Mr. Battley, a bred series of *Macroglossa stellatarum* from Sidmouth. He remarked that this species had appeared in some numbers this season, several having been observed in Clapton and other parts of North London. Mr. Hollis, *Heliophobus popularis*, a var. of *Melanippe fluctuata*, with the band reduced to a small blotch on the costa, *Pterophorus monodactyla*, &c., all from Highgate. Mr. Prout, dark vars. of *Odontopera bidentata* from Rannock, with Hale End and Sandown forms for comparison. Mr. Baxter, a fine series of *Agrotis tritici*, *A. cursoria* and *A. nigricans*, from St. Anne's-on-Sea. Mr. Bloomfield, *Melanthia albicillata* and *Boarmia repandata* from Ringwood. Mr. Riches, *Triphæna fimbria*, *Agrotis suffusa*, *A. nigricans*, &c., from Highgate Woods. Coleoptera:—Mr. Lewcock, a series of *Mezium affine*, *Xestobium tessellatum*, and other London coleoptera. Mr. Heasler, *Trechus secalis* and *Hypophæus bicolor* from Wanstead Park. Mr. Battley reported that lepidoptera were abundant on sugar and lamps at Winchmore Hill, and that he had taken the following species there:—*Asphalia diluta*, *Agrotis suffusa*, *A. puta*, *Anchocelis litura*, *Xanthia citrigo*, *X. fulvago* (cerago), *X. gilvago*, *Hadena protea*, *Ennomos fuscantaria*, and many others.

Tuesday, October 3rd, 1893.—Exhibits:—Dr. Buckell, a series of *Melanippe fluctuata*, bred from one batch of eggs. These all showed a tendency towards the completely banded form. Mr. Prout, a series of *Aporophyla australis*, a dark var. of *Caradrina cubicularis*, and a specimen of *C. superstes*, all from Sandown. Mr. Tutt, *Caradrina superstes* and *Eubolia peribolata* from Guernsey, and *Acidalia humilis* from the Isle of Wight. These, he stated, had been captured by Mr. Hodges, and he drew the attention of members to the marked characters of *C. superstes*, which species was very distinct from *C. blanda*. Mr. Battley, *Noctua xanthographa* from the London district, some of the specimens being partially melanic. Mr. Oldham, a dwarf specimen of *Halía wataria*, and series of *Xanthia fulvago* (cerago), *X. gilvago*, *Apamea oculatea*, &c., all from Woodford. Mr. Clark, a series of *Acronycta meny-anthidis* bred upon privet, and a living specimen of *Macroglossa stellatarum* from Hackney. Dr. Sequeira, a red var. of *Phlogophora meticulosa* a dark banded form of *Luperina testacea*, *Lithosia griseola*, *Eupithecia subfulvata*, and many others, all from Eastbourne. Mr. Gates, *Hepialus sylvinus*, *Crambus tristellus*, &c., from Shepherd's Bush. Mr. Bellamy, a number of species chiefly taken on lamps in North London, including *Xanthia gilvago*, *X. fulvago* (cerago), *Cosmia diffinis*, *Anchocelis lunosa*, *Ennomos fuscantaria* and *E. tiliaria*. Mr. Bacot, specimens of the large form of *Zygona trifoli* from the Norfolk coast. Coleoptera:—Mr. Newbery, *Bembidium tricolor*, Bedel, a species new to Britain.

Mr. Tutt then gave a lecture entitled "The Morphology and Physiology of an Insect," running through the main divisions of Insecta, taking the Lepidoptera as a type and comparing it with other groups. He pointed out the great differences between the various states (larva, pupa and imago) of Lepidoptera compared with those of Orthoptera, &c. He then gave a brief account of the egg and embryological development; the larva (dealing with the external and internal structure, and the nature of the ecdyses); the pupa (especially pointing out the method of suspension in the Nymphalid pupa); lastly of the imago, particularly pointing out the structure of the air passages and the eyes, and

discussing the extent to which the sense of vision is developed in insects. A vote of thanks, proposed by Dr. Buckell and seconded by Mr. Clark, brought the proceedings to a close.—A. U. BATTLEY and J. A. SIMES, *Hon. Secs.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—*September 11th, 1893.* Mr. G. Morel-Deville read a paper entitled, "A Fortnight's Entomology in the Canary Islands," in which he described the difficulties of collecting specimens in Canary owing to the intense heat, the large cactus, and the laval nature of the ground. He then recounted the species taken, the majority of which occurred in Great Britain, and gave a graphic description of the capital and general features of the country. The paper was illustrated by numerous photos and specimens. Mr. Sharp exhibited a number of Coleoptera from Worcester and Delamere; Mr. Harker, Lepidoptera from Missouri and Kentucky; Mr. Watson, the female of *Papilio phorcas*, which he stated was apparently very rare, although the male was commonly received from Africa; Mr. Newstead, nests or cells of *Crabro chrysostama* and *Pemphredon lugubris*, the former stored with a species of *Syrphus*, and the latter with an aphid, *Melanoxanthus salicis*, Lin., common on willow to be used as food, and *Cassida viridis*, taken on new land formed by the Manchester Ship Canal at Ince, Cheshire.—F. N. PIERCE, *Hon. Sec.*

LEICESTER ENTOMOLOGICAL CLUB.—*August 28th, 1893.*—Exhibits:—Mr. A. M. Corali, fine varieties of *Argynnis paphia*, including several var. *valezina*, also *Catocala promissa* from the New Forest. Mr. C. B. Headly, a black variety of *Chrysophanus phleas* from Dartmoor. Mr. G. E. Dixon, *Vanessa c-album*, second broods of *Argynnis selene* and *Thanaos tages*, also *Argynnis adippe* and *A. aglaia* from Aberystwith. Mr. Bouskell, larvæ of *Papilio machaon* in several stages, and *Viminia venosa* from Wicken Fen, also larvæ of *L. quercifolia*, *P. curtula*, and *P. reclusa*; imagines of *V. venosa*, *Calamia phragmitidis*, *Tapinostola hellmanni*, *Cænobia rufa*, and a very variable series of *Helotropha leucostigma*, *Epione apiciaria*, and *P. limbata* (? Ed.) from Wicken. Mr. C. B. Headly gave some notes on collecting on Dartmoor, remarking on the scarcity of lepidoptera there this season. Mr. G. E. Dixon gave some notes on the lepidoptera of Aberystwith. Mr. Bouskell, an account of four days' collecting at Wicken in July. A discussion took place on the failure of sugar this season. Mr. Bouskell was of opinion that "honey dew" was partly the cause, but that latterly the autumn flowers, ivy, &c., coming on earlier than usual might account for the failure.

September 27th, 1893.—Exhibits:—Mr. C. B. Headly, a box of Ccleoptera from Dartmoor. Mr. E. Pink, *Notodonta chaonia*, *Platypteryx falcata*, *Halias prasinana*, *Hadena contigua*, *H. dentina*, *Thera obeliscata*, *Cidaria suffumata*, *C. corylata*. Mr. G. E. Dixon, *Plusia festucae*, *Agriopis aprilina*, *H. protea*, *Cirrhædia xerampelina* and *Ennomos fuscantaria*. Mr. F. Bouskell, a very variable series of *Colias edusa* var. *helice*, and *C. hyale*. Mr. Pink gave some notes on collecting lepidoptera at Burdon Hill recording *N. chaonia* for the first time in the county. Mr. G. E. Dixon recorded another addition to the county list, viz., *Plusia festucae*. Mr. W. H. Scott recorded *Colias edusa* on September 15th at Scraftoft. Mr. Corali gave an account of a few days' collecting in the New Forest in July.—FRANK BOUSKELL, *Hon. Secretary.*

SPECIME

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A FEW DAYS' COLLECTING in the WESTERN HIGHLANDS.

By J. W. TUTT, F.E.S.

There is always a certain amount of interest in an English collector's first visit to Scotland. So many of our local species are restricted, or nearly so, to that country, and the methods of collecting are so different from those adopted in the South of England, that everything is novel and interesting. Besides, in many districts, the change of scenery lends an additional charm, although it often detracts from the attention that would otherwise be bestowed on the insects for which quest is being made. At any rate a first visit to Scotland was not, in the case of myself and my son, attended with a great deal of entomological work, our eyes being often attracted to objects other than insects, and a day's work, entomologically, often ending in a most lamentable fiasco so far as the capture of specimens was concerned, when compared with what would have been done on similar ground in the South of England.

I am afraid our visit would have gradually resulted in thorough-going idleness, if it had not been for the remarkable example of our companion, Dr. Chapman. The mountains of Scotland are his native home, and a fresh bit of scenery, another cairn to reach, and similar fascinating pursuits had to be done every day. True, the Doctor prospected for the scenery, often reached the cairns alone whilst we ruminated below, found the best localities for species I wanted, and then took me to see the choice bits of landscape and to catch the local species by the easiest paths and most comfortable methods, but even then, to a cripple like me, 2,000 to 3,000 feet was a most serious item in a day's work. However, I think I got a pretty good idea of what collecting in Scotland may be like, and my bag looked quite respectable before "we" had done with it. I say "we" advisedly, for whilst my companions caught insects now and again, they most assiduously left me to do the setting. Once the Doctor tried his hand at the latter job, but my pins were small, braces cut wrongly, and apparatus in general so bad that after setting three or four *Erebia cethiops*, the further aid given to this branch of the business consisted essentially in giving me instructions as to how setting ought to be done, and I felt convinced that if I had carried out, in their entirety, all the suggestions received, there would have been no one in the country whose insects I should

have considered worth having. However, example is said to be better than precept, and as the example failed conspicuously it was only to be expected that the precept would come down with a crash.

We were stationed at Lochgoilhead Hotel, and our entomological work may be briefly summarised. A piece of wood on the hill immediately to the left of the hotel (looking down the Loch) gave us many of the species common in our South of England woods at the present time. These consisted chiefly of *Pædisca corticana*, *Grapholitha penkleriana*, *Chelaria hübnereella*, *Cerostoma costella*, *C. radiatella* and its vars., *Gracilaria elongella*, *Peronea schalleriana* with its vars. *comparana* and *perplexana*, *Teras caudana* and *Peronea aspersana* whilst a few worn *Crambus pinetellus* and *C. culmellus* fell to the net. Amongst the GEOMETRÆ, *Hypsipetes elutata* was the most frequent, but it was getting worn, and it was only by the expenditure of a considerable amount of time that a good series of very nice varieties could be selected. Under this wood quite on the edge of the Loch, the food-plant of *Choreutes myllerana* (*scintillulana*) occurred, and here we found larvæ (of various sizes), pupæ and imagines, all at the same time. *Cidaria immanata* also occurred in the wood, and at dusk we netted *Epione apiciaria*, *Camptogramma bilineata*, *Melanippe sociata*, *Larentia olivata*, *Cidaria testata* with *Cidaria prunata* on the ragwort flowers. Sugar was put on here once only, and the solitary visitor was a single specimen of *Triphæna fimbria*. Above this was a heather-clad slope running up some 1,200 feet, and on the upper parts of this slope *Peronea caledoniana* was in great abundance but much worn, also *Larentia didymata* with a few late *Larentia cæsiata* sitting on the stone boulders, and an occasional *Amblyptilia acanthodactyla* on the heath blossoms, whilst between this hill and Ben Donich, the latter situated behind the hotel, a rapid burn had cut its way deep into the rocks, and the banks were thickly covered with mountain ash and birch, on the stems of which *Cidaria immanata* rested in abundance; some were remarkably pale and the general tendency to variation here was decidedly in this direction. They were, however, much easier to see than to catch, and standing on a stone in the burn, swinging round on one leg and occasionally dropping the other in the water up to the knee resulted as often in failure as in success, but the Doctor was an adept at catching under these peculiar conditions, and generally handed me his net every few minutes with two or three specimens in it to box. Wherever we went we found that similar localities produced a great abundance of *immanata*, and after a few days the remainder of my stay resolved itself into working for good varieties of this species. About a mile-and-a-half from the hotel, along the road to Glencroe, a small wood runs along the edge of Ben Donich and here *C. immanata* was also abundant, but it was remarkable what a large percentage of the specimens here were uniformly of the same type, rather dark coloured with a very intense black band, scarcely a pale one being met with. On the banks of a burn, farther on towards Glencroe, but still on Ben Donich, the specimens were particularly striking in having a large percentage of red in the ground colour, no doubt due to a response to environment, the rocks here being mainly of a dark red coloration, whilst those near the burn, previously mentioned, were remarkable for their slaty hue, and there, as I have before remarked, the large percentage of the specimens were pale forms. In most of these localities, too, *Larentia olivata* was abundant. One had only to find a hollow cavity

with an overhanging ledge of rock or matted roots of trees, on the edges of these burns, when *olivata* would be sure to start out at the slightest provocation. Its habit here was most striking and contrasted strongly with that observed in Kent, where it is a hedge-row or wayside species. The fields at the back of the hotel yielded *Charceas graminis*, plenty of *Hydroecia nictitans* of the *lucens* form, *H. micacea*, *Triphæna pronuba*, *Noctua xanthographa* and *Apamea didyma*, all from the ragwort flowers, whilst by day *Pieris napi* and *Pyrameis atalanta* were fairly abundant. But the best collecting ground in the immediate neighbourhood was evidently on Ben Bheula. Lying to the right of the Loch as we stood in front of the hotel, its three peaks made it very conspicuous, and a lovely waterfall to be seen at a considerable distance made it attractive. The two days spent there were certainly the finest, from a weather point of view, that we had during our stay. They occurred during the spell of particularly abnormal hot weather which we had in early August in England, the weather in the Western Highlands of Scotland at the same time being more or less wet (as usual). These days were exceptional however, and the weather was brilliant. *Hydroecia nictitans* was abundant and flew freely to flowers during the day; *Charceas graminis* also, the females appearing to be on the wing all day depositing their eggs. Here and there in the neighbourhood of its food, *Celaena haworthii* was frequently seen hovering over the heather blossom, but was much less frequently caught. *Cidaria testata* was common on the boggy parts, and *Peronea aspersana* occurred wherever *Potentilla* showed up above the surrounding herbage, the females small and obscurely marked. With *Cidaria testata* were a few *Melanippe sociata* and *Crambus margaritellus*, some in fine condition, others hardly recognisable, while here and there *Phygadeuon* was very abundant. At first we got nothing but the pale females, then we came across the black males, and as our bag increased I found that females of almost every intermediate shade between black and white might be found. A case of "assembling" was also noticed in this species, no less than seven black males fluttering in quite a lively manner around one female. On the rocks by the waterfall, about 800 feet up, *Cidaria immanata* was in great abundance, but only a small percentage of the specimens could be netted owing to the nature of the place. With the *immanata* an occasional late *L. cæsiata* and *L. salicata* turned up, whilst a single female of *Cidaria pyraliata*, the palest I ever saw, was disturbed from some heather. In a damp spot a little farther up, a dark race of *Cidaria populata* was not uncommon, whilst an *Elachista* probably not far from *obscura* was also abundant. At the height of about 1,000 feet I took a very fine *Larentia flavicinctata*, but the Doctor, who left my boy and myself here whilst he finished the ascent, found it rather abundant in a steep glen through which a mountain torrent ran higher up, and on our second ascent I went up to the glen in which he had found them. Here I danced from stone to stone and rock to rock in the bed of the burn for about two hours, and got about six specimens, whilst the Doctor climbed into all sorts of impossible-looking places and took some two dozen others, but they were very poor in condition, we were evidently very late for them. It was, however, a new experience, and although I would climb over the ground again to get a view of a most lovely glen the Doctor detected, and which I should think could hardly be equalled anywhere in Scotland, I don't know that *L. flavicinctata*.

would attract me there alone. However, the sight of my series of *flavicinctata* will always recall the most exquisite bit of scenery I have ever seen, and the *immanata*, the lovely cascade and waterfall lower down on the same mountain. Near the summit we took *Pamplusia monticolana*, but it was only just appearing, the specimens being in excellent condition. We intended working hard coming down, but the good intention was frustrated, as I collapsed rather suddenly and we had to make the best of our way home without adding much to our bag. *Bactra lanceolana*, however, was noticeably common on the bog. An occasional *Polia chi* was met with near the hotel, those captured being pale and so very conspicuous that one could not help noticing how little chance, specimens so coloured had of escape.

A special visit to Coulport, on the shores of Loch Long, from whence we walked over the hills to Garelochhead and then back over the hills to Cove, resulted entomologically in picking up larvæ of *Anarta myrtilli*, *Melanippe hastata* and *Viminia menyanthidis*, whilst the terminal shoots of *Myrica* were fastened up in peculiar balloon-like bundles by the larvæ of *Penthina dimidiana*. Imagines, however, were very scarce with the exception of *Larentia didymata* and *Erebia cethiops*, the latter locally abundant and in very fair condition, considering the general earliness of the season. Besides these, *Melanippe sociata*, *Cidaria testata*, *C. immanata*, *Scopula lutealis*, *Pædisca solandriana*, *Tortrix viburniana* and *Aphelia osseana* were almost the only species noticed.

Besides the above we noted *Cidaria testata*, a form with very dark undersides, the upper sides being fairly normal for Scotch specimens, at Stronachlochar, this as well as *Cidaria immanata* being abundant in the small pine plantation near the hotel, and on the heath blossoms I took *Amblyptilia acanthodactyla*. In the Trossachs, on the borders of Loch Katrine, and round the foot of Benvenue, *Larentia didymata*, *L. olivata*, *Cidaria immanata*, *Grapholitha geminana* and *Pædisca solandriana* were all very common. Dr. Chapman also reported *Celaena haworthii*, *Charæas graminis*, *Hydræcia nictitans* and *Pamplusia monticolana* as abundant on Ben Lomond, and *Scopula alpinalis* was seen sparingly on the upper slopes of the same mountain. *Vanessa urticae* was taken at a height of 1,000 feet, and seen quite on the top of Ben Bheula, as also was *Pyrameis atalanta*, by far the commonest butterfly (except the local *E. æthiops*) which we saw on our visit.

ON THE LARVA OF *ARCTIA CAIA*,

With special reference to its correlated variations in Plumage,
Moulting and Hybernation.

By T. A. CHAPMAN, M.D.

(Continued from page 268).

Of every brood of *caia* I have reared, a certain small proportion, generally not far from five per cent, feed up rapidly in the fourth skin, becoming larger in the fourth skin than the normal larva in the fifth, and moult in the fifth skin into *caia* plumage; of these some become full-grown in the next (the sixth) skin; others take a further moult into the seventh as the adult stage, and this seems the more usual course for this set of larvæ. These emerge as moths in from 11 to 13 weeks from the date of the eggs being laid.

The great mass follow the habit I have just described as the normal one, becoming moths nearly 12 months after the eggs are laid; whilst there are usually a very few, sometimes none, that progress very slowly and moult a number of times before assuming *fuliginosa* or *caia* plumage.

In each of these groups there are several subsidiary varieties, and there are even groups that appear doubtful as to which of these lines they are following.

For convenience in my notes I have called these three forms the Forward, the Normal and the Laggard types, and the names, if not elegant, are at least expressive.

Having met with these types and some subsidiary ones in my original brood of *caia*, I proposed to continue rearing them pedigree fashion, with a view to discovering how far each of these forms was hereditary and what circumstances determined the appearance of each form. Limitations of time and space led me, however, to follow only the Forward group, chiefly because it was the most easy to do. Of these several broods could be raised in a year, whilst of the others, besides the difficulties attendant on hybernation, only one brood a year was available. My observations were made, therefore, on six or seven consecutive broods (generations) of the Forward type—that is, the Forward specimens in each brood were used as the parents of the next brood observed, though I also bred several broods from Normal hibernating larvæ, both after hybernation and after forcing.

The presumption, of course, is (and my observations, so far as they went, confirm it) that, so far as the points to which I directed my attention are concerned, pedigree breeding of the Normal type will always produce just such a brood as may be obtained from eggs laid by a wild moth. Still one would suppose that there is, in the wild state, occasional crossing both of Forwards and Laggards with the Normal form, and prolonged pedigree breeding of the Normal form to the elimination of the others might produce some interesting results. I fear no one is likely to take this up for its own sake, as the labour and patience required are much in excess of the apparent value of the result; but some one, with the perhaps more attractive object of raising varieties of the imago of *caia*, would find it add little to his trouble and much to the value of his results, if he combined therewith pedigree breeding of Normal (larvæ of) *caia*.

Pedigree breeding of Laggards would be even more tedious, and probably also more difficult, but might be expected to present many interesting points. I hardly tried to follow this up, and did not succeed at all.

The Forward group of larvæ that I more particularly followed out, are, or perhaps appear to be (because I did follow them out and think I understand them) the simplest in their subsidiary varieties and in the circumstances governing the assumption of this form rather than of the others.

It appears to be entirely a matter of temperature; my broods were reared at a temperature rarely far from 60°-65°, and after six generations continually raised from Forwards, the proportion of this form remained at about 5 per cent. of the larvæ raised. In this number of generations, selection had produced no effect whatever in the direction of securing a form consisting entirely of Forwards.

Mr. Edmonds of Windsor, whose experiments with this species were conducted for several years with a view to obtaining varieties, and were not specially noted from my standpoint, nevertheless gives me some interesting information. It appears that if he obtained the larvæ small enough (probably about 3rd skin) about 35 per cent. were Forwards. He attributes this result to his method of feeding, but I think there is no doubt that, whatever the feeding may have to do with the variation of the moth, this proportion of Forwards is due to his rearing the larvæ at a higher temperature than I did in my experiment.

The crucial experiment in this matter was undertaken by Mr. Merrifield, who reared a portion of a brood at a temperature of 80°. This portion presented 150 Forwards to 50 of other forms, whilst my portion only yielded the ordinary 5 per cent.

My Forwards completed a cycle in about three months, Mr. Merrifield's, at 80°, did so in two months, so that whilst mine yielded nearly four broods in a year, Mr. Merrifield's would have given six.

These Forwards then are clearly a response to a higher temperature and may be taken as an attempt to produce a summer brood should the summer be warm enough. Here we are met with the question—are these Forwards to be found at large? Well, many persons, including so acute an observer as Mr. Barrett, tell me that they have never seen them and doubt their existence. On the other hand, since I have made enquiries I have heard of several having been seen; I have met with one myself, and several instances have been recorded in the magazines. It is also to be remembered that *caia*, though a common larva, does not present itself, unless specially looked for, in anything like the number that actually exists. It is no doubt probable also that the Forwards naturally are much fewer than even in my experiments, as they have the low night temperature to affect them.

(To be continued).

STRAY NOTES ON CERTAIN SPECIES OF BUTTERFLIES.

By J. W. TUTT, F.E.S.

Chrysalides of Melitæidi.—The pupæ of our three British species of *Melitæa* are very closely allied, being plump and with the head rounded. I had so-called pupæ of *maturna* sent me from Nürnberg, but these produced typical imagines of *cinzia*. There could be no doubt from the pupæ that they were *cinzia*, and I waited anxiously to see whether two closely allied species had such similar pupæ that I was unable to detect any difference.

Chrysalides of Argynnidi.—There would appear to be two very distinct groups of pupæ in our British species of *Argynnis*, one with the head well developed into lateral projections, the other with the head blunt and the anal segment turned back very considerably. Of those I have been able to examine, *Argynnis paphia* and *A. euphrosyne* belong to the first group, *A. aglaia* and *A. adippe* to the second. The pupa of *A. niobe* also belongs to the blunt-headed group. The pupa of *A. aglaia* is the most extreme in this direction and is very peculiarly doubled back on itself so that the cremaster comes quite close to the tips of the antennæ.

Pupa of Argynnis niobe.—A pupa of *A. niobe* sent me from Nürnberg, arrived with the imago fully formed and coloured but with the pupal wing-cases removed so that the imaginal wings were fully exposed. Thinking the imago had no chance of emergence, I left it in a box on my table. This was about 8.15 a.m. When I returned at about 5 p.m. I was much astonished to find that the imago had emerged during the day and that its wings were fully developed.

Chrysalides of Vanessidi.—As in the *Argynnidi*, there are two very distinct types of pupæ among the species that I have been able to examine of those which we include in the genus *Vanessa*. One of these groups is blunt-headed, the other has the lateral processes of the head well-developed. The blunt-headed group consists of *Pyrameis cardui* and *P. atalanta*, the pupæ being remarkably alike in almost every particular. The group with pointed lateral head pieces, consists of *Vanessa io*, *V. urticæ*, *V. polychloros* and *Grapta c-album*. These latter, however, differ very much *inter se* with the exception of *urticæ* and *polychloros* which are structurally very similar. *G. c-album* has the lateral head pieces curiously curved inwards towards their tips, so that they almost meet; it is also a more angulated pupa. The pupa of *V. io* bears a very close superficial resemblance to that of *V. urticæ*, but is without the median row of dorsal knobs found in all the other species mentioned.

Third brood of Chrysophanus phlæas.—Pupæ of a third brood of this species with a very late larva of *Lycæna argiolus* were sent to me during the second week in October from Guernsey. An imago of *C. phlæas* emerged on November 2nd. The larva of *L. argiolus* pupated on the day of arrival.

Second broods of some Vanessa species.—During the last week of August, larvæ of *Grapta c-album* were sent to me feeding on nettle. These pupated as soon as I received them, the imagines appearing some 15 days afterwards. In answer to a request in the September number of the *Record*, larvæ of *V. urticæ* were sent to me from Cambridge. These pupated directly afterwards and emerged during the second week of October. A farther supply of the same species was sent me from Darlington in the following week, these were smaller and emerged from October 20th–22nd. Pupæ of *V. io* were sent to me by Dr. Chapman, from Hereford, all of the dark grey form. These emerged a fortnight afterwards, the whole number (12) coming out within three hours (9–12 a.m.) of each other on September 30th. A batch of larvæ of *P. atalanta*, from Winchester, pupated in the last week of September and emerged between October 15th and October 30th, whilst another lot from Galway emerged from October 1st–15th, some of the latter being only in the third skin during the second week in September. A full-fed larva of *P. atalanta* received from Dr. Chapman has emerged this morning (November 5th). It is worthy of remark that the whole of the Galway *atalanta* larvæ were of the black variety with orange lozenges down the sides, those from Winchester were about one-half of this form and one-half of the usual greenish type. The larva from Hereford was also of the black type, and an exceptionally dark specimen of this particular form.

SCIENTIFIC NOTES & OBSERVATIONS.

NOTES ON REARING *DASYCAMPA RUBIGINEA*.—A few further notes on the successful rearing of *D. rubiginea*, this time from the bred insect, may be interesting. The insects kept from the brood of 1892 (*ante* pp. 1-4) were eight in number, two being cripples, 4♂ and 4♀, and they gave little trouble during the winter. They were supplied with thin syrup on which they occasionally feasted, remaining generally quiescent under the curled-up withered apple leaves. They were kept in a room without a fire, facing N.W., and during the severe frost, the box, with another covered top in which they were, was partly wrapped in wadding. In February I noticed them arranging themselves two and two, unlike their previous positions, and I have little doubt that they paired at that time, though none were seen *in copulâ*. The first eggs were deposited on March 4th, the weather being unusually warm for the season. By March 19th over 100 eggs had been laid, and the females continued ovipositing till the first week in May, when the three (the cripples died towards the end of the winter) had deposited between them close on six hundred eggs. Some of these hatched on April 5th, and the larvæ continued to emerge till the middle of May, but many of those last laid failed to go through their changes, and though the young larvæ became visible they died in the shell, and others were not fertile. Probably they were not kept moist enough considering the hot weather, and so got addled. Under similar circumstances, I should be disposed another time to force them. The young larvæ fed up on apple and dandelion leaves as before, taking, however, at once to the latter much more freely than in 1892. This was fortunate, as there were but few apple leaves out at the time: they refused plum. By April 16th a few had gone through their first moult, and on May 24th many were full-fed and some had formed cocoons. By June 2nd all had spun up. As in 1892, the larvæ fed on dandelion almost exclusively after their last moult. The cages were kept in an out-house facing N.W., with plenty of air passing through. The imagines emerged first on August 29th, and have continued coming out to the present time, *viz.* October 28th (only three cold days being marked as blank in my diary), in all considerably over two hundred in number. I have found little variation; only in the intensity of the colouring, and that not very marked. They all have the white dots more or less developed. Between three and four hundred eggs hatched, and of the larvæ I kept for myself there was a mortality of about five per cent. during growth.—W. S. RIDING, Buckerell Lodge, nr. Honiton. *October 28th, 1893.*

RAPID GROWTH OF SOME SUMMER GEOMETRÆ.—I have read with interest Mr. Walker's notes on the breeding of *Ephyra orbicularia* (*Record*, p. 269), as the rapid attainment to maturity of some of the many-brooded Geometræ is a matter which I have watched somewhat closely. I may cite two rather striking instances from my own note books.

Coremia ferrugata.—A batch of ova laid June 5th, 1891, hatched June 15th; larvæ spun up July 4th to 6th (duration of larval state, 19 to 21 days); imagines emerged July 16th to 20th. Period from egg to imago, 31 days.

Melanippe sociata.—A batch of ova laid July 15th and 16th, hatched

July 24th, 1893; last full-fed August 16th (I have no record as to when the *first* was full-fed); imagines emerged August 24th to September 1st. Period from egg to imago 31 days.—LOUIS B. PROUT, 12, Greenwood Road, Dalston, N.E. *October 18th, 1893.*

PRACTICAL HINTS.

THE MONTH.—During this month, if the weather be mild, the later species may still be caught at light, such as *Pæcilocampa populi*, *Himera pennaria*, &c. but the collection of imagines is now getting over for the season. The “Chestnuts,” however, may still be taken at ivy, so also may *Xylina socia* and *semibrunnea*, the latter now a rare species, eggs being much wanted by some of our leading lepidopterists. *O. erythrocephala* should now be sought for. It has been much offered in exchange from Kent during the last few years, but no captures are ever recorded. The birch woods should be carefully worked for *Cheimatobia boreata* and *Hybernia aurantiaria*. *Dasycampa rubiginea*, like *Orrhodia erythrocephala*, is more especially a November species and occurs both at sugar and ivy bloom.

Pupa-digging should be persisted in. Isolated trees generally pay best, because the larvæ cannot spread so much as they do where the trees are closer together. Some dozens of common *Tæniocampicæ* are frequently obtained, from which beautiful series of varieties are bred. The rare Notodonts are all to be found in the little angles at the base of the trunk where it meets the ground. Ash trees should be carefully felt over with the hand, and the hard knobbly cocoons of *Bisulcia ligustri* carefully cut out from under the moss. Holes in the trunks of elm trees, where dirt and decaying leaves have collected, are almost sure to produce pupæ of *Smerinthus tilia*.—J. P. MUTEH.

AMUSEMENT FOR WINTER EVENINGS.—Any entomologist who is subject to fits of the “blues” cannot do better than provide himself against such times with a copy of *The History of our British Butterflies*, by Mr. C. W. Dale, F.E.S. of Glanville’s Wooton. In it he will find much mirth-moving matter, as well as a very interesting series of extracts from the works of early English entomologists relating to our indigenous species. A couple of samples of Mr. Dale’s humour may enforce this recommendation. They are selected from his attempts to indicate the derivation of the Latin names. The first relates to *epiphron*, and is as follows: “*Epiphron*, perhaps a grammatical error for *Ephron*, a Hittite, who sold to Abraham a plot of land to bury his wife in. Ephron is a Hebrew word signifying dust” (p. 110). The other relates to *Nisoniades*, a name first applied by Hübner in his *Verzeichniss* to a genus which includes *tages*. The derivation of this word has baffled Mr. Dale, and in the corrigenda at the end of the book he makes this suggestion concerning it, “perhaps an error for *Bisoniades*, resembling a bison, given in allusion to the shaggy and heavy appearance of the species.”—F. J. BUCKELL, 32, Canonbury Square, London, N.

I would add another good joke to the above, culled from the same work. The eggs of the species of *Vanessa* as might be expected are very much alike, especially those of *V. urtica* and *V. polychloros*. Sepp, about 130 years ago, gave a figure of the egg of *V. polychloros*, which either belonged to another species, or, as Dr. Chapman has since

suggested was a figure of the egg of *polychloros* after hatching, the egg being inverted. He was led to this conclusion by observing a batch of newly-hatched *V. io* larvæ, which first ate the tops of the eggs, then spun threads over them; after this they ate the nettle leaf below, when the batch of eggs got inverted, the apparent tops being the smooth inverted bottoms, and having the general appearance described by Sepp.

In the introduction to Newman's *British Butterflies*, p. 8, the author, as if it were his own observation, writes: "One of the most curious and striking facts is the extreme difference in the eggs of species, which, in the perfect state, closely resemble each other; thus the egg of the Large Tortoise-shell is pear-shaped and smooth, while that of the Small Tortoise-shell is oblong, with eight very conspicuous ribs. The characters of each egg are, however, so constant in each species of butterfly, that anyone who has paid attention to the subject can immediately say to what butterfly any particular egg belongs. Nevertheless, a naturalist must not delude himself into a belief that he can classify butterflies by the shape or structure of their eggs."

Now this scientific (?) conclusion based on such material is amusing to start with, as it is very evident that Newman never saw the egg of *polychloros*, but based his remark on material copied from other well-known authors who had based their statements on Sepp's figure, so that a series of observant (?) authors copy the same error from one another without acknowledgment, each in turn pointing out to the world the self-same moral, and each pretending that the whole is a result of his own observation and reasoning power.

But Mr. Dale out-Herods Herod. In *Ent. Mo. Mag.*, vol. viii., pp. 52-53, the error made by Sepp and his successors is pointed out, and a true description of the egg of *polychloros* is given. Mr. Dale, who, in his work, continually quotes Hellins' and Buckler's descriptions of larvæ, appears to have been aware of this correction, for he gives a description of the egg of *polychloros* as follows: "The egg resembles a short squat barrel, ribbed with eight or nine longitudinal even ridges, which extend over the flattened top, but appear to cease on reaching the base; the space between the ribs is transversely fluted, but much more finely than in the egg of *urticeæ*, although the latter is not half its size; the colour apparently is a dull green. The eggs appear to be deposited in close, regular order on a twig of elm, after the style of *Clisiocampa neustria*" (*British Butterflies*, p. 166). This is word for word the Rev. J. Hellins' description (*Ent. Mo. Mag.*, viii., p. 53), even the reference to *C. neustria* coming from the same source, but without acknowledgment.

This description appears in the body of Mr. Dale's work. Now this was brought out in parts as a supplement to *The Young Naturalist*, but some two years after this paragraph had appeared, Mr. Dale wrote his *Introduction* to the work. He appears to have entirely forgotten that he had already made a copy (without quotation marks) of Hellins' description on p. 166, for he now writes: "One of the most curious and striking facts is the extreme difference in the eggs of some species, which, in the perfect state closely resemble each other. Thus the egg of the Large Tortoise-shell is pear-shaped and smooth, while that of the Small Tortoise-shell is oblong, with eight very conspicuous ribs. The characters of each are, however, so constant in each species of butterfly that anyone who has paid attention to the

subject can immediately say to what butterfly any particular egg belongs." There are no quotation marks again, so evidently this is the result of another (later ?) observation made by Mr. Dale. I do not like to suggest it, but the verbatim similarity of this erroneous statement to that of Newman just quoted, leads one insensibly to suppose that the observation was made, not on an egg of *polychloros*, but on p. 8 of Newman's *British Butterflies*. Compilers are most useful men if they will only use quotation marks, but it is too bad to give as the result of observation, paragraphs from other works, especially when these happen to be erroneous.—J. W. TUTT. *November 8th.*

VARIATION.

CHELONIA PLANTAGINIS AB. HOSPITA.—On the 12th of May last I again saw four specimens of *C. plantaginis* ab. *hospita*, and on the following day one more. This makes eight specimens seen by me during the last two seasons on the same piece of broken ground where the type is pretty common. I should be glad to hear whether this ab. is generally found as far south as this!—F. B. NEWNHAM, Church Stretton, Salop.

ABRAXAS GROSSULARIATA AB. DOHRNI.—In *Entom.*, April 1889, I applied the name *deleta* to the aberration of *A. grossulariata*, in which the black markings are very much reduced. Looking over the *Bull. Soc. Ent. France*, April 24th, 1889, I find the same aberration referred to by M. C. Oberthür as ab. *dohrni*. I have not at hand the necessary literature to ascertain which name has priority, but probably it is *dohrni*, as M. Oberthür does not appear to indicate the name as new.—T. D. A. COCKERELL, Agricultural Experimental Station, Las Cruces, New Mexico, U.S.A. *August 20th, 1893.*

CHRYSOPTERUS PHLEAS VAR.—This butterfly has verily abounded this autumn. I have seen it far away from its larval home, flitting merrily along the dusty main roads, and it seemed to be quite at home in our gardens. A very nice variety was presented to me last month. It was taken at Barnes. The spots on the primaries are very large and elongated. The specimen is in good order and nearly approaches a banded form taken some years ago in Worcestershire.—ALFRED T. MITCHELL, 5, Clayton Terrace, Gunnersbury, W. *October 3rd, 1893.*

VARIETY BREEDING.—Much time has been devoted of late years by entomologists in general to the collecting and breeding of "varieties" of insects, and the almost universal ambition of most "brothers of the net" now is to secure some startling departure from the usual typical forms. I think, however, that in the majority of cases, not of course without some striking exceptions, the great aim of the entomologist has been to secure a good row of "vars." for his cabinet, rather than to advance the ends of science. A favourite practice is that of breeding large numbers of larvæ, frequently those of *Arctia caia*, upon almost every conceivable food-plant, without making any particular observations about them, leaving them to fate until the imagines emerge. Then, if any peculiar variety does appear, instead of hazarding having it "spoiled" in endeavouring to pair it with another similar form, I am afraid the tempting thought of "How nicely that would fill up the last row in my bottom drawer" is frequently far too strong, and another chance of

study is practically lost to the cause of science. It is an illustration of that peculiar custom which so many entomologists have of preferring the study of dried-up specimens to that of the actual living forms. If an insect is an interesting object when in the cabinet, how much more interesting must it be while in the living state, and then too, the long and tedious process over which so much time is often wasted—setting—is avoided! Although a few of the usual wholesale larval breeding experiments may have occasionally had good results, yet unless some thorough system is adopted, success rests only upon chance, and much valuable time and work are likely to be wasted.

In Nature there is a cause for every effect, and there is not a single detail of colour, form or action but has some special function to fulfil. One of the great laws of Nature is, "That under the same conditions the same cause will always produce the same effect," therefore it is clearly evident that all variations of form must have some source, as unless there were some reason for this variation, all forms would always be, in every respect, exactly the same as their parents. Before much can really be learnt about a variety, it is first necessary to find out as much as possible about the particular cause which compelled it to alter from the usual type. To begin with, one must ask oneself such questions as, "What is the reason for this marking?" "What is the cause of this shape?" "Why does this species fly in the sunlight?" etc., and however complex and difficult the question may be there is the consolation of knowing that somewhere or other there is a satisfactory answer to it; and the harder this is to discover the greater will be the reward when the problem is solved. One of the greatest difficulties to overcome is, I think, the "loss of varying power," into which state so many species appear to have more or less fallen by the process of "natural selection."

As the "struggle for existence" in past generations between the preying and the preyed-upon forms grew stronger, the force of offence on the part of the one, and defence on that of the other, brought each nearer and nearer to perfection; so that, after a certain time, by this constant improvement, each form would become as nearly perfect as was possible for it. It is clear that when arrived at this state, the only possible variation must be in the wrong direction. This would mean annihilation for such forms, as they, not being in the same way so well protected as the main stock, would, in all probability be the first to be picked off by one of the enemies of the race, and thus gradually by "natural selection" all such weak varieties would die out, leaving only the approximately perfect forms to become the parents of all future generations. The descendants of these, being governed by exactly the same laws as were their ancestors, and being kept up by their enemies to the same standpoint of perfection, would gradually, by their law of inheritance, lose to a great extent their old power of varying. Thus it is now a very difficult matter to produce in a short time with certainty, any great variations from old and long-fixed forms, but by removing as much as possible all enemies and other hindering forces for a considerable number of consecutive generations and substituting in their place new forces such as artificial selection, with a certain amount of perseverance good results ought to be obtained.—
ALFRED J. JOHNSON, Boldmere, Erdington. *October 21st, 1893.*

CURRENT NOTES.

The City of London Society is to be congratulated on the fact that it includes some of our hardest-working coleopterists. Mr. Newbery has just added *Bembidium iricolor*, Bedel, to the British list. This is the *riparium* of Canon Fowler's *British Coleoptera*. He has also criticised the nomenclature of the group, and suggests that the three species in this particular group should be called *B. biguttatum*, *B. iricolor* and *B. lunulatum*.

Mr. Morton (*E. M. M.*, p. 249) gives some interesting accounts of the "Micropterous forms of *Tæniopteryx nebulosa*," one of the *Perlidae* found near Cleghorn. He also records the capture of *Agapetus delicatulus* in Arran last July.

Dr. F. J. Buckell will, on November 21st, at the meeting of the City of London Entomological Society, read a paper entitled "The History of Butterfly classification." All interested in entomological science are cordially invited, and we have no doubt that the paper will prove very interesting; the subject has not been dealt with in this country for many years.

We have to record with regret the death of Mr. J. Batty, of Sheffield, on October 14th, at the age of 62. We are informed that he was the last survivor of the Sheffield Entomologists' Club, and that he first discovered the larvæ of *Tapinostola elymi* and *Celæna haworthii*. His work of late has been chiefly with the *TORTRICES*, and he has paid considerable attention to the collection of the melanic forms of certain species, which appear to occur somewhat freely round Sheffield. Our own correspondence with him seems to have pointed him out as a man with a large practical acquaintance with the larvæ of many species of Micro-lepidoptera, and a generous disposition to get them for correspondents. Mr. A. E. Hall, Norbury, Sheffield, would be pleased to hear from any correspondents, whose boxes are in the possession of Mr. Batty's family.

Our Editorial concerning *Deilephila euphorbiæ* (*ante* p. 249) has at last drawn from the Rev. J. Seymour St. John (*Ent.*, p. 314) an explanation that should have been given "in the interests of entomology as well as of truth" some years ago. We are sorry to have injured Mr. St. John's personal feelings, but when he states that we impugned Mr. Fry's veracity we can only deny it *in toto*, and remind him that at the time our Editorial was penned we had never, to our recollection, heard of Mr. Fry's existence. What we objected most strongly to was the mythological "young friend," who figures far too frequently in entomological communications. If Mr. St. John had taken the proper course of giving the real captor's name in his first communication, we might have formed a different judgment on the matter long ago. We object most strongly to the method adopted by Mr. St. John of recording a *bona fide* capture, a method which his tardy explanation shows to have been entirely unnecessary.

ERRATUM.—Page 272, line 4, for "triple-hooded" read "triple-brooded."

NOTES ON COLLECTING, Etc.

UROPTERYX SAMBUCATA AND PYGÆRA BUCEPHALA IN SEPTEMBER.—I have not yet come across any record of a second brood of *U. sambucata*, and in consequence was surprised to see a fresh specimen at rest on a lamp at Hammersmith on the 20th of September. On the 29th of this month I found a fine female of *Pygæra bucephala* drying her wings at Putney, and I presume that this is also one of a second brood rather than a case of retarded emergence.—ALFRED T. MITCHELL, 5, Clayton Terrace, Gunnersbury, W. September 29th, 1893.

CALAMIA LUTOSA IN LONDON.—A fine example of this species was found at rest on a lamp-post in the High Road, Chiswick. I think it is of unusual occurrence in this locality.—ALFRED T. MITCHELL, 5, Clayton Terrace, Gunnersbury, W. October 2nd, 1893. [Capt. Thompson recently exhibited a specimen taken this year near The Angel, Islington.—Ed.]

CATOCALA FRAXINI, COLIAS EDUSA AND HYALE IN GUERNSEY.—A specimen of *Catocala fraxini* was brought to me by a boy on October 3rd; he had found it resting on a gate post at the Ruettes Braye. From its battered condition it had evidently been on the wing for some time. This is the second recorded specimen for Guernsey. The first was taken some years ago at St. Martin's by Mrs. Boley, and is now in the museum of the Guille Allées Library. *Colias edusa* has again put in an appearance this autumn, but, although in some numbers, is not so abundant as it was last year. Mrs. Boley captured a pair of *Colias hyale*, the female specimen being almost pure white in colour.—W. A. LUFF. October, 1893.

NOTES ON VARIOUS LEPIDOPTERA.—*Ova of N. trepida.*—I am of opinion that *N. trepida* usually lays its eggs on the bark of oak-trees, for within a radius of half a mile I have found three very distinct sets of ova all laid on the bark of oaks. This spring, strange to say, I found a lot of eggs of this species laid on whitethorn (*Cratægus oxyacanthæ*): these, too, were placed on the bark. Is not this also the way in which *S. fagi* deposits its ova? [Crippled specimens are supposed to do so.—Ed.]

Earliness of larvæ this season.—I got a full-fed larva of *N. trimacula* in the chinks of oak bark on the 7th June this year. This larva is usually found here at the end of July and beginning of August.

Early Appearances.—I saw newly-emerged specimens of *V. urticae* on the 10th of June last, and *A. aglaia* on the 11th. I consider this very early for this neighbourhood.

Lithomia solidaginis at Church Stretton.—For the first time here I got a very good ♂ specimen of *L. solidaginis* at rest in the garden on the 13th August last.

Second brood of A. selene.—A second brood of *A. selene* appeared here about the middle of August. I got specimens on the 14th of that month.

Autumn larva of Chelonia plantaginis.—One larva of *C. plantaginis*, reared from the egg among many others, began to spin towards the latter half of September; the pupa, which is undersized, has not so far yielded the imago. I consider this interesting, as the species, unlike *ruscula*, is never double brooded on the Continent, so far, at least, as I know.—F. B. NEWNHAM, Church Stretton, Salop. November 4th, 1893.

PIERIS DAPLIDICE AT DOVER.—I was fortunate enough to capture a fine specimen of the Bath White (*Pieris daplidice*) at Dover on the 18th of July last. I shall be glad to furnish you with further information if you require it.—H. T. KINGSMILL, 21, Harley Street, Cavendish Square. October 21st, 1893.

SOME COGITATIONS ABOUT SO-CALLED RARE BRITISH MOTHS.—Some years ago a number of fine specimens of *Pachetra leucophæa* were distributed by one or two collectors and dealers in insects from the neighbourhood of Canterbury, and were stated to have been captured near that city. Considerable doubt was thrown on the British authenticity of these specimens, owing to the introduction of *Argynnis niobe*, *Cnethocampa pityocampa*, and other foreign species just previously by the same collectors, whilst *Leucania l-album*, *L. albipuncta* and *Cerastis erythrocephala* were then being sent out, the two latter in considerable numbers, as also was *A. lathonia*. Then some time after, series of *Dianthæcia conspersa*, received by well-known collectors had an occasional specimen of *D. compta* included, until at last everything from Canterbury in the shape of rarities was carefully avoided by British collectors. It becomes necessary now to look boldly at this matter, and to consider the subject in its various aspects, especially with regard to *Pachetra leucophæa* and *C. erythrocephala*. Mr. S. Stevens records the former species from the Box Hill district some thirty-five years ago. These (16 or 18 specimens) are recorded in Newman. Then Mr. Jeffrey took it near Ashford (*E.M.M.*, xiii., 64) and from specimens since obtained by him, ova have been distributed and specimens reared by two or three well-known naturalists, including Dr. Chapman and Mrs. Hutchinson, but probably not more than a score altogether. Then Mr. Elisha captured a pair at Box Hill (*Ent.*, vol. xii., p. 205) and got eggs, but failed in rearing them. Afterwards, Mr. Bower took a ♀ (*Ent.*, xv., 162) but failed in rearing the larvæ he obtained (*E. M. M.*, vol. xix., p. 43). Mr. Hanbury records (*Ent.*, vol. xxvi., p. 275,) "six captured by a friend on the South (North?—Ed.) Downs," presumably some years ago, whilst he has "collected the insect in the past" but it has only "occurred so sparingly" that "until this year" he had not filled his own series, but this year was able not only to do this but "to distribute a few pairs among his friends." Mr. Parry now comes to the front and maintains the *bona fides* of the Canterbury specimens, gives the exact locality as "the 'Devil's Kneading Trough' Brook, about a mile-and-a-half from Wye (Kent) S. E. Railway Station, on two very high banks the further and highest (*sic*) being the best." It is well-known as an extremely early species, the Continental lepidopterists sending out eggs in large quantities during May. Sometimes it occurs in April, sometimes as late as the first or second week in June, and this makes Mr. Stevens' remark that the specimens he took were flying round privet bloom rather inexplicable, as privet, although it varies much in its time of flowering, rarely flowers so early as *P. leucophæa* appears. Mr. Stevens says that there is a nice series in the Rev. Mr. Burney's collection from the South (North?—Ed.) Downs. Are they from the Ashford side, or from the Canterbury (Wye) side? If the latter, are they now to be accepted unquestionably as British? It is well to face these matters as they crop up. I have recently considered myself fairly well informed on these matters, and keep myself *au fait* with Magazine and other Entomological literature. If anyone had asked me a few weeks ago

how many British specimens there were of *P. leucophæa* in all the British collections I should have said fewer pairs than there appear to be dozens. To those who collect insects for their inherent beauty and to learn something from them, I would add that British specimens of *P. leucophæa* vary in no way from the Continental specimens. The latter can be bought at a penny each and eggs can be obtained at 1½d. per dozen from the Continental dealers in the spring.

Another species which is generally considered very rare as British, puzzles me. Last year, I had several letters sent me referring to offers of *Cerastis erythrocephala* from Canterbury, in one case as many as five specimens being offered in exchange for quite ordinary species. Now Mr. Stevens says (*Ent.*, xxvi., p. 297) that he has a long series taken under the South Downs between Brighton and Eastbourne, and again inland between Dover and Canterbury. It is of course to be assumed that this series has been purchased. Mr. Hammond, who used to live midway between Dover and Canterbury, informed Mr. Stevens that he used to take this species on ivy in his own garden. Mr. Stevens further observes that there are "in Mr. Burney's collection several specimens mostly from the latter neighbourhood," i.e., Canterbury. In looking over the magazines I find one record for the species during the last twenty years, viz., at Wells, Somerset, by Dr. Livett (*Ent.*, viii., 279). Now if the Canterbury specimens in Mr. Stevens, and the late Rev. H. Burney's collection are British, there is no reason to suppose that those sent out by the Canterbury dealers are not the same, and *vice versâ*. Assuming them to be British, why do we pretend our ignorance of this species by not publishing captures, and why do we not put the species on the same level as does the collector who offers it in exchange for ordinary species? I must record it as my emphatic opinion that the undoubted British specimens in our crack collections and the doubtful ones offered in exchange are all parts of the same broods, caught in the same woods, or bred in the same pots. We are all interested in the matter. It is not a personal one! I want to put it on a broader basis. The man who buys these things and is afraid to say he has them may be ignored, he has no part in entomological science, but we do want to know whether some of our species do occur in Britain or not. Messrs. Hanbury and Jeffrey have lifted the cloud in part from Kentish *leucophæa*. Who'll do the same for Kentish *erythrocephala*? Things have been swarming at sugar this autumn. *Erythrocephala* isn't over yet. Who'll go to Canterbury and catch a lot during the next fortnight. Leisure and inclination are the only requisites. I must add that Mr. Parry, Church Street, Canterbury, has offered for many years to take me, personally, to get both these species, but however much I have had the inclination, I have never yet had the leisure. That he will extend his courtesy to any other lepidopterist equally interested I have no manner of doubt.—J. W. TUTT, Westcombe Hill, S.E. October 13th, 1893.

NOTES FROM CANNOCK CHASE.—The complete absence at light of many insects usually plentiful in the earlier part of the year, prepared me for a bad year, and subsequent events fully bore out my forebodings. In addition to being scarce, insects have been difficult to time, and I have no doubt missed many owing to this, at the same time I have added several new names to the list of insects taken round here. At the beginning of June *Asthena luteata*, *Eupisteria heparata* and *Hypsipetes impluviata* were common in the alder swamps on the Chase, and I also

took several ♂s of *Taleporia pseudobombycella* flying in the sunshine, an insect I have never taken in the perfect state before, though the cases are usually plentiful. Captures at light were *Thyatira batis*, *Hadena suasa* and *H. thalassina*, *Caradrina morpheus*, *C. alsines*, *Noctua rubi* (the forms I get here are small, and seem analogous to those small forms of *N. festiva* figured by Newman under *N. conflua*) *Plusia iota*, *P. pulchrina*, *Selenia lunaria*, *Acidalia imitaria*, *Eupithecia pulchellata*, *Hypsipetes ruberata*, *Eucosmia certata*, and other common species. Nothing was taken in any plenty, and after the 20th June light was an utter failure. Even *Noctua xanthographa* was quite a rarity. I bred sundry *Polia chi* from larvæ feeding on tansy (*Tanacetum vulgare*), an uncommon food plant but one that blends admirably with the caterpillar, so well indeed that it might be its normal pabulum. This larva feeds on all kinds of unlikely plants. I have found it on lily of the valley, foxglove (leaves and flowers), passion flower and thyme. The larvæ were somewhat plentiful this year, but imagines were scarce. I only got one *Notodonta dictæoides*, and I think that this and other moths with thick-skinned pupæ died in that stage owing to the extreme dryness of the ground; the disparity in numbers of the larvæ and imagines of *P. chi* seems to bear this out. Besides this the larvæ of many common Nocturæ were plentiful in the spring, though the imagines were exceedingly scarce. *Argynnis aglaia* came out very irregularly, and it was difficult to get a decent specimen. *Stilbia anomala* was true to time and as common as usual, and a friend of mine took a few *Plusia interrogationis* at honeysuckle. Autumnal larvæ have been very scarce, certain young poplars usually well stripped by *Smerinthus populi* and *Dicranura vinula* escaped almost scot-free this year, and I did not see a single larva on them. In September *Vanessa atalanta* was exceedingly common, likewise *Polyommatus phloas*, and I saw a couple of *Vanessa c-album* in addition to those captured by Mr. Burnett and recorded in last month's *Record*. I believe this insect has never been taken here before; the nearest locality seems to be Repton Shrubs. At light I took one *Xanthia cerago* var. *flavescens* and three *X. gilvago*, whilst *Diloba cæruleocephala* simply swarmed, and was the only moth really common this year. I need not point out that this moth has a thin-walled pupa, and dry weather would make no difference to it. The common garden larvæ are conspicuous by their absence this autumn, but Nature has endeavoured to stop the gap by providing an extra crop of earwigs, which have done a great deal of damage to my flowers, especially the dahlias. Of second broods (unusual here at least) I have seen the following:—*Eupithecia nanata*, *E. pulchellata*, *Caradrina cubicularis* and *Rumia crategata*.—RICHARD FREEER, Rugeley, Staffs. October 31st, 1893.

AUTUMN NOTES.—*New Forest*.—In the November number of *The Ent. Record* last year I gave an account of our sugaring experiences in the New Forest, and as we have been sugaring the same ride this autumn in the same way, it may be interesting to relate this year's experience for comparison with that of last year. The first night on which my son and I sugared was September 5th, the last was October 9th. During that period we sugared thirteen times. We took 520 insects and saw the same species as last year, with the exception of *Triphaena subsequa* (of which we had a few weeks earlier taken several specimens near Romsey), *Epunda nigra* and *Calocampa vetusta*, and we

have to add as new specimens taken this autumn *Leucania comma* and *Tapinostola fulva*. The chief features of this autumn season have been the abundance of *Hadena protea* and *Xylina rhizolitha* and the great variety of the former species. Altogether we have taken 152 specimens of *H. protea* (and left pretty nearly as many more) and it is hardly too much to say that no two specimens are alike. They vary from almost white to very dark blackish-green—some being bright green, some dark green and some almost red—and among them there are more than twenty specimens of the variety described in *The Varieties of British Noctuae* as var. *variegata*, and figured No. 3 in Newman's *British Moths*. One specimen is especially noticeable. The forewings, besides being of an extremely dark green colour and almost unicolorous, are long and narrow, very unlike the usual type of the species. We also took 215 specimens of *X. rhizolitha*, and there is hardly any variation at all to be seen in all these specimens. Some are rather darker in the forewings and some rather lighter, the hind wings of the former being also of a darker colour, but the markings and coloration are very similar in all the specimens. Other species which varied very greatly and occurred more freely than usual this year, are *Anchocelis pistacina* and *Orthosia macilenta*, on the other hand *Scopelosoma satellitia* was very scarce. There were fewer *Xylina petrificata*, and we only took one each of *Anchocelis lunosa* and *L. comma* (but the Rev. G. M. A. Hewett, who sugared the ride on one very wet night, was fortunate enough to take one *E. nigra*, two *A. lunosa* and one *X. petrificata*). Among the specimens of *Miselia oxyacanthæ* which were taken was one var. *capucina*. The dates of first appearances are very similar to those of last year. The hot dry season does not seem to have affected the autumn insects much in this respect. *X. rhizolitha* appeared for the first time on September 7th; *A. litura* and *Cidaria psittacata* on September 11th; *Xanthia cerago* and *X. silago* (which was unusually scarce) on September 13th; *X. petrificata*, *A. pistacina*, *A. rufina*, *S. satellitia* and *Thera firmata* on September 18th; *M. oxyacanthæ* and *O. macilenta* on September 22nd; *L. comma* and *A. lunosa* on September 25th and *O. lota* on October 5th.—J. C. MOBERLEY, Southampton. October 18th, 1893.

Guernsey.—An experimental visit to ivy blossom about October 14th on a very suitable, mild evening, resulted in the capture of single specimens of the following species: *Epunda nigra*, *E. lichenea*, *Polia flavicincta*, *Xylina petrificata* and *Caradrina superstes*. There were plenty of *Anchocelis pistacina*, but few of anything else; but we confined ourselves to a radius of a very short distance from the house. The occurrence of *C. superstes* so late in the year is interesting. I have now taken them here from the end of June to the middle of October.—ALBERT J. HODGES. October 21st.

Morpeth.—I sugared on the 7th and 14th October, and I found common moths plentiful, but I was surprised to see some of the trees which I sugared on the 7th were still on the 14th attracting moths. I saw at the sugared trees the following:—*Agriopsis aprilina*, *Phlogophora meticulosa*, *Agrotis suffusa*, *Anchocelis rufina*, *A. litura*, *Scopelosoma satellitia* (plentiful), *Orrhodia vaccini* (very plentiful), *Miselia oxyacanthæ*, *Orthosia macilenta* (common), *Calocampa exoleta*, *Hadena protea*, and *Mellinia circellaris*. This is rather late for the appearance of the last two species in this locality.—J. FINLAY. October 30th, 1893.

Clevedon.—After the first week or two, insects at ivy have been much scarcer. I took my first *Dasycompa rubiginea* last Saturday night. *Petrificata* is very scarce this autumn. I took two specimens of *Xylina semibrunnea* the second week in September, much earlier than usual, but have not seen any more.—J. MASON. October 23rd, 1893.

SOCIETIES.

ENTOMOLOGICAL SOCIETY OF LONDON.—October 4th, 1893.—Mr. F. Merrifield exhibited specimens showing the effects of temperature in the pupal stage on several species of Lepidoptera. *Vanessa polychloros* was much darkened, especially towards the hind margin, by a low temperature. *Vanessa c-album* showed effects on both sides, especially in the female; they were striking on the under side. Several examples of the striking effect produced by temperature on the summer emergence (*prorsa*) of *Araschnia levana* were exhibited. Some *Vanessa io* showed the gradual disintegration by exposure to a low temperature, of the ocellus on the fore wing, which in the extreme specimens ceased to be an ocellus, and was a remarkable confirmation of Dr. Dixey's views of the origin of that ocellus, as exemplified in the plate attached to his paper in the Entomological Society's Transactions for 1890. Mr. Goss stated that in his experience of *V. c-album* in Northamptonshire, Gloucestershire, Herefordshire, and Monmouthshire, the form with the pale under side was the first brood, occurring in June and July; and that the second brood, occurring from the end of July to October, was invariably dark on the under side. Mr. Jacoby, Mr. Merrifield and the President continued the discussion. Mr. A. H. Jones exhibited Lepidoptera collected in Corsica in June last, including dark forms of *Polyommatus phleas* (Vizzavona); *Lycæna astrarche*, in which the orange marginal band is very brilliant on upper and under sides of both wings (Vizzavona); *Lycæna argus*, the females of which are much suffused with blue, probably var. *calliopis*; a series of *Vanessa urticae*, var. *ichnusa*, bred from larvæ found at Vizzavona (4,000 feet); *Argynnis elisa*, *Satyrus semele* var. *aristæus*, *Satyrus neomiris*, *Cænonympha corinna*, both spring and summer brood (Vizzavona); *Syrichthus sao* var. *therapne*, and many others. Mr. G. C. Champion exhibited, for Mr. G. A. J. Rothney, a number of *Methoca ichneumonoides*, Latr. (female), taken at Bexhill, Sussex, showing great variation from the usual large black and red form to a small and nearly black one. Dr. D. Sharp exhibited a pupa of *Galleria melonella*, on which the eggs of a parasitic Hymenopteron, as he believed, had been deposited while the insect was in the cocoon. He also exhibited from the collection of Mr. Alexander Fry, the hitherto unique *Aprostoma planifrons*, Westw. The genus was correctly assigned by Westwood to the *Colydiidæ*, though described as a Brenthid. Mr. J. J. Walker exhibited the following species of *Halobates*, viz.:—*H. sericeus*, Esch., from the Pacific; *H. sobrinus*, B. White, from Marquesas Islands; *H. wüllerstorffi*, Esch., from Marquesas Islands; *H. princeps*, White, from the China Sea; and a female of *H. wüllerstorffi*, with ova attached. Mr. W. H. B. Fletcher showed a variable series of seventy-five *Cymatophora or*, bred in 1893 from larvæ from Sutherland, a series of about forty *C. ocellaris* bred-in from stock from Oundle. Also a series of thirty-three moths,

all females, supposed to be hybrids between *C. ocularis* male and *C. or* female, from the above stock in each case, bred as a second brood in August and September, 1893. He stated that he placed the reputed parents in a muslin sleeve on a branch of *Populus nigra*, and did not open the sleeve until the resulting larvæ required fresh food. To the best of his belief the female parent had no chance of pairing with a male of her own species. The supposed hybrids resembled the female parent, except that both orbicular and reniform stigmata were very conspicuous, being pure white filled up slightly with black, whereas in *C. or* they are usually inconspicuous, and the orbicular is sometimes wanting. None of the *C. or* bred had the stigmata developed so fully as had the hybrids, which were most uniform in this respect. Mr. F. J. Hanbury exhibited a specimen of *Leucania vitellina*, taken at Brockenhurst on August 24th, 1893, by Mrs. Hanbury, and another taken by himself at Freshwater, Isle of Wight, on September 7th; also an extraordinary *Gonepteryx rhamni*, showing red blotches at the tips of the fore wings, taken by a gardener at Walthamstow, Essex. Mr. C. G. Barrett exhibited a gynandrous *Argynnis paphia* recently taken in the New Forest by Mr. Cardew. Mr. J. M. Adye exhibited a specimen of *Deilephila livornica* recently caught at Christchurch, Hants. Mr. Elwes exhibited and described two species of the genus *Cœneis* (*Chionobas*, Bdv.), *C. beani* and *C. alberta*, from North America, which had not previously been described, and stated that he had prepared, with Mr. Edwards's assistance, a revision of this very difficult genus, which would be read at the November meeting. Mr. Osbert Salvin communicated a paper entitled "Description of a new genus and species (*Baronia brevicornis*) of *Papilionidæ* from Mexico," and exhibited both sexes. Dr. Sharp read a paper entitled "On the Cost and Value of Insect Collections." Mr. W. F. H. Blandford, Mr. McLachlan, Mr. Jacoby, Mr. Waterhouse and the President took part in the discussion which ensued. Professor Auguste Forel communicated a paper entitled "Formicides de l'Antille, St. Vincent, récoltées par Mons. H. H. Smith." Mr. W. F. H. Blandford read a paper entitled "Description of a New Subfamily of the *Scolytidæ*." The President, Mr. Jacoby, and Mr. Waterhouse took part in the discussion which ensued.

October 18th, 1893.—Mr. R. Adkin exhibited two *Leucania vitellina* and one *L. extranea*, taken by Mr. B. W. Adkin in the Scilly Islands, in August, 1893. Mr. R. South exhibited a specimen of *Polyommatus beticus*, and a number of varieties of *Chrysophanus phloxæ*, captured in Kent, in September last by Mr. Sabine; also a curious variety of *Argynnis euphrosyne* taken in Lancashire in May, 1893, by Mr. T. Baynes; a pallid variety of *Vanessa urticaæ*, taken by Mr. W. E. Cox in Monmouthshire, in July, 1893; and a *Triphæna pronuba*, the right wings of which were typical, and the left wings resembled the variety *innuba*, caught at sugar, in Dovedale, Derbyshire, by Mr. Blagg in July, 1893. Mr. G. H. Verrall exhibited a specimen of the Tsetse (*Glossina morsitans*), and also one of the common European allied species (*Stomoxys calcitrans*). He also exhibited a specimen of *Hæmatobia serrata*, Dsv., which, he stated, was not uncommon on cattle in England, but believed to be harmless; while in North America the dreaded "horn-fly" is said to be the same species. Mr. Elwes exhibited a larva which he had found three days previously under stones on a moraine, apparently quite destitute of vegetation, in the Tyrol, at an elevation of about 7,000

feet. He remarked on the number of Alpine butterflies, some of them in fresh condition, which he had seen whilst chamois-hunting in the Tyrol during the last week, and he suggested that in such a fine autumn as the present one, collectors might find more novelties among the larvæ of Alpine species than in the summer. Colonel Swinhoe read a paper entitled "A list of the Lepidoptera of the Khasia Hills" (Pt. 2). Mr. Elwes said he thought all entomologists would be grateful to Colonel Swinhoe, Mr. Hampson, Mr. Meyrick and others, for the work they had recently been doing in describing the moths of India; but as the district of the Khasia Hills was probably richer in species than any other part of India, except Sikkim, and new species were being received almost daily, it was impossible to make any list complete. Mr. Jacoby, Mr. McLachlan, Mr. Jenner Weir, and Colonel Swinhoe continued the discussion.—H. Goss, *Hon. Sec.*

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY. October 12th, 1893.—Mr. J. H. Carpenter exhibited long series of the pale spotted forms of *Argynnis paphia*, L. and a small form of the same species, all from the New Forest; Mr. Tutt remarked that this pale-spotted form was frequently tinted with green as in var. *valezina*, more especially the females. Mr. Frohawk exhibited examples of *Vanessa cardui*, L., *V. atalanta*, L., *V. polychloros*, L., &c. being the largest and the smallest he had bred or captured, the difference being very considerable. Mr. Barrett exhibited a gynandrous specimen of *Argynnis paphia*, L., taken in the New Forest, the left fore-wing and about one-third of the left hind wing, male, the remainder, female; also, amongst others, the two broods of *Vanessa levana*, L. and *V. c-album*, L., lent by Mr. Merrifield of Brighton, showing the seasonal dimorphism produced from the same batch of ova by means of artificial warmth and cold. Mr. South exhibited a specimen of *Orthotænia antiquana*, Hb., taken on 28th June, 1893, on a shop window in St. John's Wood, also long series of *Pyrausta purpuralis*, L. and *P. ostrinalis*, Hb., both of which he considered to be forms of one species, many that he showed being intermediate* and referable to either, a long discussion following. Mr. B. W. Adkin, *Leucania vitellina*, Hb. and *L. unipuncta* from the Scilly Isles. Mr. Auld, a specimen of *Vanessa atalanta*, L., having an orange band on one hind wing, and red on the other. Mr. Briggs, a bright blue female *Lycæna bellargus*, Rott. Mr. Dennis exhibited examples of a partial third brood of *Pararge megæra*, L. Mr. Turner showed three specimens of the Scotch form of *Arctia menthastri*, Esp. Mr. Adye, a specimen of *Deilephila livornica*, Esp., captured at Christchurch 25th May, 1893. Mr. McArthur, a second brood of *Boarmia repandata*, L. from the south of Ireland. Mr. Jenner Weir exhibited specimens of the Tsetse Fly (*Glossina morsitans*), received from Dr. Percy Rendall, in the Transvaal; also a specimen of a *Depressaria*, taken by him more than thirty years ago near Lewes, probably *D. aurantiella*, Tutt, which differed from *D. badiella*, Hb., in possessing bright orange-coloured palpi, these in the latter species being dark brown. Mr. Robert Adkin exhibited a series of *Cymatophora or*, Fb., bred from larvæ found feeding between

*I pointed out in this discussion that the supposed intermediate forms were apparently small female forms of *P. purpuralis*, identical with specimens taken by me with normal-sized individuals at Cuxton. The specimens were wanting altogether in the peculiar shape of the costa found in *ostrinalis*.—J. W. T.

united leaves of aspen in Sutherlandshire, together with representatives of the South English, Shetland and Rannoch forms for comparison, calling attention to the variation existing between them. Mr. T. R. Billups exhibited a number of species of rare Diptera, taken at Oxshott and Dulwich, including amongst others *Helomyza pallida*, Fb., *Sciomyza dubia*, Mg., &c. Mr. C. Oldham exhibited *Xanthia circellaris*, Hufn., *X. gilvago*, Esp., *Anchocelis lunosa*, Haw., *A. litura*, &c. from Essex, Cambridgeshire and Norfolk.—H. WILLIAMS, *Hon. Sec.*

Thursday, October 26th, 1893.—J. Jenner Weir, Esq., President, in the chair.—Mr. Frohawk exhibited a second brood of *Argynnis paphia* from eggs of var. *valezina*, only one of the four specimens being the var. The ova were laid in June, and the larvæ hatched in July. Mr. Tutt remarked that he had seen specimens of a second brood of *A. paphia* and had bred second broods of *Vanessa urticae*, *atalanta*, *io* and *c-album*. Mr. South, Continental examples of *Lycæna bellargus*, with its var. *ceronus*, a female, blue like the male, with the fulvous spots very distinct; *L. corydon*, with a female specimen of its var. *syngrapha*, and a var. with its fringes perfectly white; also large and very dark specimens of *L. arion*. Mr. Weir remarked that many years' experience of the Blues at Lewes had produced but little variation. Mr. S. Stevens, a specimen of *Tinea simplicella*. Mr. Barrett remarked on the rarity of the species, but Mr. Tutt stated that he had captured it in two localities in Kent during the last few years. Mr. Hamm, long series of the two broods of *Leucophasia sinapis*, well illustrating both their seasonal and sexual dimorphism; *Colias edusa*, among which was a female with only the faintest trace of a spot in the black border, and several var. *helice*; long series of *Melitæa aurinia*, bred from Hampshire, with captured specimens from Hampshire for comparison, also a remarkable scaleless aberration; it was noted that some of the Hants specimens were comparable to var. *hibernica*; a specimen of *Chrysophanus phlæas*, with only two spots on the primaries; bleached vars. of both *Epinephele janira* and *E. tithonus*; a var. of *Smerinthus tilæa*, a long series of *Toxocampa pastinum*, a most remarkable var. of *Epinephele hyperanthus*, having only one wing normal, the others with the yellow rings on the under side much enlarged, the colour being irregularly spread over a considerable area, and streaks of it protruding into the black ground; a case containing long and varied series of all the British species of the genus *Xanthia*, that of *X. gilvago* and *X. aurago* being especially noticeable; some fine *Dasyccampa rubiginea* and *Cosmia paleacea*, with many other species. Mr. Carpenter, bred series of *Triphæna comes* from Aberdeen, and of *Aplecta prasina* from Essex. Mr. Enoch, a very dark female of the dark April brood of *Lycæna argiolus*, taken at Torquay by Master John Enoch. Mr. P. Bright, a gynandrous specimen of *Argynnis paphia*, the left side male, the right female; a specimen of *Ematurga atomaria*, very dark, with only a few traces of the yellow markings, and another specimen with three normal wings, the right inferior being uniformly dark; a very dark female *Stilbia anomala*, and a varied series of *Emydia cribrum*, some being banded. Mr. Adkin, the following types of variation in *Chrysophanus phlæas*, taken at Eastbourne on September 4th. (1) Showing the sub-marginal row of black spots on the primaries, reduced in some specimens to minute dots; (2) Showing spots large, costa and wing rays thickly dusted with black scales;

(3) Showing No. 3 of the submarginal series connected with the discoidal spot by a black streak; (4) The spots showing a tendency to elongation; also a long and variable series of *Boarmia repundata*, bred during August from South of Ireland ova, among them there were examples of both the *conversaria* and *destrigaria* forms. He remarked that this was only a partial second brood, about half the larvæ being now in hybernation. He considered this remarkable, as his long experience showed this species to be most persistently single-brooded, and he had in this case taken no special care to induce the larvæ to feed up. Mr. McArthur, very dark specimens of the same species bred from the same locality. Mr. Carpenter stated that he had unsuccessfully attempted to force the larvæ of this species. Mr. Billups, the Tsetse fly, *Glossina morsitans*, with *Stomoxys calcitrans*, the nearest akin to it we have in this country; also the rare species of *Lascophagida*, *Cynomyia mortuorum*, captured at Oxshot in July, 1891. Mr. Weir, *Heliconius rhea* and its mimic *Papilio pausanis*, and remarked that not only the colour of the *Heliconius*, but the shape was also closely mimicked, in which latter respect it departed much from the usual form of the *Papilionina* of South America. Mr. Frohawk, pupa of *Argynnis adippe*, and a discussion ensued relative to the two types of pupa noticed in each of the genera *Argynnis* and *Vanessa*. He also exhibited a wild raspberry gathered on Tooting Common, and remarks were made on the second crops of strawberries and raspberries occurring this year.—HENRY J. TURNER, *Report Sec.*

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*Tuesday, 17th October, 1893.* Exhibits:—Dr. Buckell, series of *Mellinia circellaris* from Highgate and Aberdeenshire; Mr. Clark, bred specimens of *Notodonta ziczac* and *N. dromedarius* from the New Forest. Mr. Tremayne, *Colias edusa*, *Orthosia lota*, *Epunda lichenea* and others, taken at Dawlish during September last. He gave a short account of the collecting in this neighbourhood, from which it appeared that sugar was almost useless, but ivy proved very attractive. Mr. Riches, *Smerinthus populi*, bred during August (second brood), and *Cidaria miata* from Hornsey. Mr. Battley, *Selenia illustraria*, bred from two broods of larvæ from New Forest parents. Although these were both the spring brood, they showed a considerable difference in coloration. Mr. Oldham, *Calamia lutosa*, a var. of *Agrotis segetum* without any orbicular spots; also a specimen of a sawfly, *Tenthredo ex neglecta*. Mr. Lewcock, part of a wooden post, containing cells of the Carpenter bee (*Osmia fulviventris*). Mr. Newbery then read a paper "On *Bembidium iricolor*, Bedel." He stated that although this species appeared to be common on salt-marshes, it had not been hitherto recorded as British, owing to its great similarity to other species of the genus. Mr. Tutt proposed a vote of thanks to Mr. Newbery for his paper. This was seconded by Mr. Heasler, and carried unanimously.

Tuesday, November 7th, 1893.—Pocket Box Exhibition. Exhibits:—Mr. Boden, *Melitæa athalia* with very few black markings and bred specimens of *Spilosoma mendica*, the females having a black line on the costal and outer margins. Mr. Mera, bred specimens of *Callimorpha hera* and *Apamea ophiogramma*. Mr. Battley, long and variable series of *Anchocelis pistacina*, *A. litura*, *A. lunosa*, *Mellinia circellaris*, *Orrhodia vaccinii*, and other autumnal species, all from Winchmore Hill. Mr. Goldthwait, *Spilosoma menthastris*, with very few black spots, and a

series of *Setina irrorella* from Box Hill. Mr. Riches, *Xylina petrificata* from Salisbury, and *Macroglossa stellatarum* taken in a hole in a wall, where, he suggested, it had gone for the purpose of hibernation. Mr. Bacot, *Stauropus fagi*, *Notodonta trepida*, *N. dodonæa*, *Cuspidia leporina*, *Amphidasys prodromaria* and bred specimens of *Phorodesma smaragdaria*. Mr. Nicholson, *Epunda lichenea*, a reddish var. of *Orthosia lota* and *O. macilenta*, all from Dawlish, also *Melanippe fluctuata* from Clapton with the band reduced to a small costal spot, and bred specimens of *Coremia unidentaria*, including the red form. Mr. Oldham, *Plusia moneta*, a var. of *Anchocelis pistacina*, with the lower ends of the discoidal spots joined by a dark bar, pale forms of *Xanthia gilvago*, and a long series of *Triphæna pronuba*. Capt. Thompson, *Orthosia suspecta* and *Asthena blomeraria* from York, and *Telea promethea* from the United States. Mr. Turner, vars. of *Ephyra trilinearia*, one specimen having only the faintest trace of the centre line, the other line being suppressed; *Vanessa urticæ* bred from an ichneumonid pupa, the wings being perforated by the emergence of the parasite, xanthic specimens of *Epinephele janira* and *Argynnis selene*, and *Orgyia antiqua* from Sutherland and Surrey, the discoidal spots being crescent-shaped in the former and square in the latter. Dr. Sequeira, vars. of *Boarmia repandata* from various localities, *Lithosia quadra* and *Eulepia cribrum* from the New Forest, *Dianthæcia albimacula* from Folkestone, and a large number of dwarf specimens of various lepidoptera. Mr. Hockett, bred series of the second brood of *Arctia caia*, some of the specimens being decidedly paler than the average, and series of several GEOMETRÆ bred this season. Mr. Clark, a number of Scotch lepidoptera, including *Sesia scoliiformis*, *Petasia nubeculosa*, red forms of *Charcæas graminis*, a very dark specimen of *Triphæna orbona*, *Tæniocampa gothica* var. *gothicina*, *Anarta cordigera*, *Phibalapteryx lapidata*, dark forms of *Cidaria populata*, *Scopula alpinalis*, *Crambus furcatellus*, and *Sericoris micana*. Coleoptera:—Mr. Newbery, specimens of the genus *Bembidium*.—A. U. BATTLE and J. A. SIMES, *Hon. Secs.*

LANCASHIRE AND CHESHIRE ENTOMOLOGICAL SOCIETY.—October 9th.—The Rev. R. Freeman, 6, Station Road, Prescott, was elected a member of the society. Dr. J. W. Ellis read an interesting letter from a correspondent in Grahamstown, South Africa, giving descriptions of the habits of some species of Coleoptera from that district. He also showed a large number of species illustrative of the letter he had received; Mr. Crabtree, *Hydrelia unca* from Ulverston, and *Arctia lubricipeda* var. *radiata*; Mr. Stott, on behalf of Mr. H. S. Clark of Douglas, a number of Lepidoptera from the Isle of Man; Mr. Gregson fine series of *Abraxas grossulariata*, and banded forms of *Vanessa urticæ* bred by him this year; Mr. Capper, a grand series of *Boarmia roboraria*, including a pair of black forms from Coventry; Mr. Jones a variable series of *Bombyx trifolii*; Mr. Sharp, examples of melanic Coleoptera, which, he stated, had been unusually plentiful this year, which went against the theory of damp producing melanism;* and Mr. Harker, a specimen of *Dasypolia templi* captured in the heart of Liverpool.—F. N. PIERCE, *Hon. Sec.*

* Most probably the exhibitor, having recently directed his attention to the study, paid more attention than usual to these forms, and hence collected more. He would be interested, we feel sure, in Mr. H. F. Wickham's article referred to ante p. 246.—Ed.

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AN AUTUMN DAY.

By REV. G. M. A. HEWETT, M.A.

It was a late autumn morning, one of those rare mornings of November whereon autumn mistakes itself for spring. A gale from the south had blown itself out during the night, scattering the last withered leaves from the lower boughs of the elms. But there was still breeze enough to send the shadows of the clouds racing over the downs, and on the breeze was the indefinable perfume of the spring. The ear listened for the abrupt and broken melody of the storm-cock's song, and the eye turned instinctively to the hedgerow banks, to note the little green things of the earth peeping up to spy if winter was really gone. But there was after all no calling of birds in the air, and on the banks nothing but the mouldering remains of the nettles and the brown hedge-leaves, still shining after the night's rain. And so the dull apathy of the season settled down again upon the mind. It was as if an old man should dream of youth and youth's voices and visions—and then awake. There is an alertness and expectation about a spring walk which is altogether wanting in an autumn ramble: but an autumn naturalist has this advantage over his spring brother, that he has less often to face a feeling of disappointment at the end of his day. Some expeditions in April require a phenomenal amount of luck to leave that feeling of satisfaction on the mind which is kindled by a very moderate bag in the autumn. And again; in spring a day over is a day gone and lost for ever, one day less of the splendour of young life; but in autumn it is enough to have lived; we regard the past with a feeling of complacency and equanimity. We have come to look upon change and decay as the established order of things, and the death of another day stirs few feelings of regret within us. And so, perhaps, age is happier than youth.

I am afraid that A. found me rather a silent companion as we strolled along on the morning in question. I may have been thinking such thoughts as I have expressed, but I doubt whether I was conscious of anything more than the absolute blessedness of the first and best pipe of the day, and the merits of porridge first and then kidneys and bacon, and then cold pie, and then toast and strawberry jam for breakfast. I may, perhaps, pause to defend myself from the charge of gluttony. I do not always refresh myself in this somewhat lavish manner. But we

were going into a region unblessed as regards the presence of the public-house, and I felt convinced that, if I did not store up a tolerable supply of material to work upon, I should feel the pinchings of hunger about 1.30 p.m., and the day's bag would suffer in consequence. What A.'s thoughts were meanwhile—poor pipeless A.—I can only gather from the fact that his first remark, when silence was at last broken, was a question as to what I was expecting to find. A. is young, and I fear that, as youth will, he had been making up his bag beforehand. It is a pleasant habit, and, like other pleasant habits, often unwise. One of the most ordinary instances, besides the partaking of lobster late in the evening, is the playing of golf or other games of skill in bed. Every stroke is absolutely correct. We magnanimously forbear to do anything exceptionally brilliant, but nothing goes radically wrong. Hence come disappointments when we face the reality next day. So I expect that A., without making the discovery of any absolutely new species, had collected, in imagination, a very handsome bag of useful specimens to bring home in the evening. However, the silence was broken, and we chatted along cheerily enough up Blackberry Lane, where the clematis gives forth its treasures in May and June, but where nothing to-day tempted us to linger. Nay, the perfume of the pigsties rather hastened our steps. Past Oliver's Battery, the home of the Blues, and so down to Hursley Kennels, where the hounds were being mustered for the chase. Here we had an awkward moment's hesitation. Our sporting instincts rose. Why should we not abandon the homely bug and chase the wily fox? Our day hung in the balance for a moment, but A. remembered that the ploughs would be wet, and I remembered that my wind was not so good as it had been in better days. Also I once headed a fox when following on foot, and can still recall some of the language. So we decided just to watch them off and no more. We had a small pang and feeling of shame as they departed, and wondered what our friends would have said had they marked our choice. But we were getting near to our work, for there are a few ash trees on the roadside, where Hursley church first comes into view nestling in its hollow among the trees. To the first of these we raced, and were soon busy among the scanty moss at the base. A. drew first blood with a cocoon of *Bisulcia ligustri*, but it was empty, a year old, and so were two more, which we alternately produced. Then A. took a distinct lead with an obviously new one, glossy as a newly-tarred board, and hard and firm—but how was I to equalise? The tree was searched all round—No, there was a little moss-covered rootlet running down into the hedge. I scratched my hand, but produced two new cocoons and smiled, as those smile who win a race. Not broadly, so as to hurt the feelings of others, but just a flicker of a smile to show that one is pleased. And so the chase went on, down the hill to Hursley village, haunted by memories of Keble, and I had found but one more to A.'s three, and I believe I detected a glimmer of a smile on his face then. The King's Head beckoned to us to enter and drink the health of the captives, and it was our only chance for the rest of the day, but we were fresh and eager and passed it by. We thought of it with some regret a few hours later. And then beyond the village came disaster to me and mirth, chastened mirth, such as a younger man displays in the presence of the misfortunes of an elder, on the part of A. For, in surmounting some barbed wire with intent to trespass, I impaled the seat of my faithful

breeches and caused a wide and gaping rent. I once saw a keeper perform a similar feat, and remember the main drift of his desires, which were expressed with some circumlocution but ended with a prayer that he might be allowed, someday, to rub a nice piece of that stuff up and down the back of the inventor of that same stuff, and my wishes took a somewhat similar direction. A. pinned me up with two pins and a long thorn, to keep out some of the draught, but I was a soured man, and the more so, as A. took two more cocoons, while all mine were aged and empty. So I determined to seek other woods and fields, far from the haunts of men, which was rather hard on A, as he was doing pretty well. But he had to come or be left behind. Into Ampfield Wood, therefore, we plunged, regardless of warning notices. But, somehow, the dread of the keeper, whose unbending nature we knew by experience, and the lack of pupæ on the oaks and of moss on the ashes, drove us quickly through, richer on my part by two of our old friends and a few *Lithosia rubricollis*, while A. had confined himself to two of the latter and four *Orgyia pudibunda*. Having emerged in safety from these dangerous quarters, we set out across country, for a long tramp to Crabbe Wood, which is full of ash trees and less rigorously guarded. Here we meant to enjoy ourselves in peace and harmlessness. But alas! the wind had fallen and it was beginning to drizzle by the time we got there. This was the more vexatious, as our luck began to improve with our change of quarters. How long we fought against the ever increasing dampness I should not like to say, but, at last, we gave in. We were tired, hungry and wet, and the light was getting bad, so we said that they would keep for another day, and set off on our last tramp of four miles, over hill and dale to Winchester. How we hated those hills, and how we loved, as far as the now drenching rain would allow us, those dales. But oh! how we loathed that rain. However, perpetual walking, even under the worst of circumstances, brings a man to the end of his journey at last. And when you have had a warm bath, and have settled down to hot tea and muffins, with the prospect of a dry pipe in view, you soon begin to think that your day has not been misspent, that your bag is even more than adequate, and that there are worse things in the world than a day's bug-hunting in November.

Pupal Development and Colour of Imago.

By J. W. TUTT, F.E.S.

The discussion which took place at the South London Entomological Society on October 12th, when Mr. C. G. Barrett exhibited specimens of various species which had been subjected in the pupal stage to different temperatures by Mr. Merrifield, must be my excuse for writing the following remarks concerning pupal development in relation to imaginal coloration.

At the moment of the first formation of the pupa the whole of the imaginal structures appear to be present, and when the surface secretion hardens and forms the chitinous envelope it binds these down in their respective positions. We look on the larval ecdyses as forming a series of stages in progressive development, of which the last, that from which the pupa results, presents a very great advance on the earlier ones. We all have, I suppose, a general idea that at this

time the tissues have reached a certain stage of development, that some change goes on inside the pupa, and that the imaginal structures (digestive, respiratory, nervous, scale &c.) are perfected or formed in the pupal stage, but from the statements made during the discussion before referred to, it would appear that here most of us stop.

As Professor Weismann's theory, that the tissues of the pupa undergo "histolysis," appeared to be unknown to many of those present it may be worth while to call attention to it. It was formerly supposed that, when the larva changed to a pupa, the tissues simply underwent a progressive development resulting in the formation of the scales, &c., in other words that the imago was from the first in the pupa with its parts, &c. formed, and that it simply progressed in development until maturity was reached. But Professor Weismann has shown us by his experiments that development in the pupal period is in no way so simple as this idea would suggest, but that the tissues of the larva, having reached a comparatively high degree of perfection at the time of pupation, break down in the pupa and are reduced to more elementary units, degeneration as it were setting in. After this has been brought about, a rapid regeneration takes place; new tissue is rapidly formed, new structures are built up, and the pupa, instead of being, as we have been apt to consider it, in a particularly inactive condition so far as really active changes in the tissues are concerned, is probably more completely vitalised than is the egg or larva, and is, therefore, very susceptible to any external influences which might affect its vitality. It is during this period that the wing membrane and scales are formed, together with the strictly pupal structures.

The knowledge of these facts has led many of our leading lepidopterists to refer to the pupal structures rather as definite organs of the pupa than as imaginal organs enclosed in cases. Thus we talk of the wings or antennæ which are seen in an empty pupa case (and of course also in a living pupa) as the "wing-cases" or "antenna-cases," whilst the same wing-cases with their contents are termed "pupal-wings," and the antenna-cases with their contents "pupal antennæ," until the final stage of development. When development is actually complete and the colour of the future imago becomes conspicuous through the pupa case, the mature organs are frequently termed imaginal wings, &c., although still confined in their pupal cases. It is well, however, that we should remember that there are pupal organs and that differentiation of tissue and actual growth take place in the stage.

If we apply the simplest elementary laws relating to vital force to the pupa, we shall find that the following facts hold good:—(1) The pupa when first formed has a certain amount of inherent vital force by means of which both the processes of "histolysis" and of "rehabilitation" are carried on in it. (2) That pupa which has the nearest approach to the normal amount of vital force will undergo the most perfect "histolysis" and "rehabilitation," and will produce an imago most nearly conforming to what is known as the normal type, that is the type produced under the most healthy and satisfactory conditions. Conversely that pupa whose amount of vital force is farthest removed from the normal (whether in excess or in defect) is one in which "histolysis" and "rehabilitation" will be least perfect, and the imago

produced will be farthest removed from the normal type. (3) That individual which has been best fed and which has enjoyed the most perfect health in the larval stage will enter pupal life under the most satisfactory conditions and will (the pupal conditions being equally satisfactory) emerge therefrom as the best specialised product, whilst the converse to this must also be true.

The second point also deals with an elementary principle. The vital force in the pupa is converted into energy; the energy at the disposal of the pupa is most probably directed first to the building up of the vital reproductive organs, and afterwards to the secondary organs or tissues, or such as are not necessary to life. Therefore, an excess of energy in a pupa will be expended as a rule on secondary structures rather than on vital ones, and we find that a weak or diseased pupa fails first in regard to non-vital tissues, such as pigment, scales, wing membrane, &c.

The females of insects, as compared with the males, require an excess of energy for those structures necessary to the reproduction of the species; they, therefore, have a smaller surplus to devote to the formation of the non-vital tissues, and, as we well know, frequently fail very markedly in their development of these.

We are now in a position to understand that, as a general rule, pigment, scales, &c. are produced in proportion to the amount of material and energy available for the purpose.

These and other general principles have to be considered when we attempt to discuss the results which Mr. Merrifield produces by his temperature experiments. To attempt to discuss the results without first understanding these principles can only lead to futile conclusions.

If we now apply these principles what do we find? Insects which are allowed to pass through their changes at the normal temperature produce the form which is normal for the district; that is, they undergo the normal processes of histolysis and of rehabilitation, and in a state of health have at their disposal the energy requisite to give them their ordinary wing expanse, scaling and colour. Now what does Mr. Merrifield do in his experiments. He subjects the pupa to a low temperature. This of necessity lowers the vitality of the pupa, and so lessens the available energy. The insect, therefore, does not develop under normal conditions, and an abnormality is the result. The insect must use what energy it has to build up its vital organs, and fails in building up perfectly its secondary tissues—colour, scales, wing membrane, and fails, too, in direct proportion to the degree in which the vitality is lessened. Below a certain temperature during the period of active development the vital force ceases to act at all, and the result is death. Heat, greater than that to which the insect is normally subjected, instead of lowering the vitality to the lowest ebb at which life can be sustained, affects the histolysis and rehabilitation in a directly opposite manner. Under its influence the vital processes are carried on at express speed. Energy is expended at the fastest rate possible, and the tissues are formed without having sufficient time to mature as they would under normal conditions (we may here suppose these to be those which are most beneficial to the species, and probably as being the result of "natural selection"), the surplus material is rapidly utilised, with the result that as marked an abnormality is

produced under the one condition as under the other, although in an opposite direction.

So far then we see that a change made in the environment of the pupa must necessarily produce some effect on development. If the change be sufficiently extreme, then the effect is death; anything short of such an extreme will produce an effect proportioned to its magnitude. If a pupa be thoroughly acclimatised to a given range of temperature, then excessive heat or cold must be injurious. The variability of our climate renders it certain that few species are perfectly acclimatised, and that, therefore, a moderate range of temperature has but little actual effect on them, something considerably beyond the ordinary mean range being necessary for this purpose.

It has been suggested to me with regard to acclimatisation that it must be borne in mind that some species do better in cold, others in hot, some in wet, others in dry seasons. Whether this be due to the fact that some of our insects have spread to us from more northern, others from more southern latitudes, or to other causes, it renders it probable that the same amount of heat may act prejudicially on one insect and advantageously on another. In the latter case increased heat may be expected to produce effects due to an increase of vitality, whilst in the former cold will produce the same result. A great excess of either would, of course, be injurious to any species. To an insect that exists here say in a mean temperature of 54° but prefers 60°, any decrease of temperature will be injurious, but increased temperature will not effect it prejudicially until it exceeds 60°, probably not until it exceeds 66°.

It has also been suggested that an insect may have been trained by "natural selection" to assume a particular form at 50°, another at 60°, another at 70° and so on, and that this may be an element in the production of dimorphic or trimorphic seasonal forms.

Are not the results foreshadowed in the above considerations found in Mr. Merrifield's specimens? Do not a large percentage of his specimens exactly fulfil these conditions? The colour, the scaling, the wing membrane in almost all those that are subjected to extremes in either direction of heat or cold have suffered; sometimes all three characters are markedly abnormal in the same specimen.

Now with regard to the direction in which the colour of the imago will vary according as the pupa is subjected to heat or cold. In the Introduction to *Brit. Noctuxæ and their Vars.*, vol. II., pp i-xxiv., I have detailed a large number of facts and experiments with regard to insect colours and have made suggestions as to their sequence and relationships. The colours of insects are, I take it, largely dependent on three things:—(1). The pigment in the scales themselves. (2). The shape, &c. of the scales (giving rise to the non-pigmentary colours). (3). The colour of the wing membrane. The relationship of all these must be considered if we are to get any true idea of the changes which the colours of insects undergo when exposed to abnormal temperatures, and there can be no doubt that all three are affected by Mr. Merrifield's treatment.

It follows, from the physiological details enumerated above, that the colour may be affected in any of these directions. (1). The pigment may fail in whole or in part. In this case the ground colour of the basement membrane of the scale itself may replace the ordinary colour;

then; if the membrane of the scale be pale, it would account for the greater number of cases in which small areas of the wing become pale. Conversely darker patches might be produced if the ground colour of the scale membrane be darker than the pigment displaced. (2). The scales may be imperfectly developed or fewer scales than usual may be produced. The former condition would greatly affect non-pigmentary colours, *i.e.*, those that are due to striations on the scales, &c.; the latter would affect the colour by allowing the basement membrane of the wing to appear to a much greater extent than usual, and would lead to an increase of pale or dark coloration, according as the basement membrane of the wing was paler or darker than the scales. Under this head, too, would come those cases where there are two (or more) sets of scales, one set longer than the other and usually more or less covering them. The normal colour would then be affected by the increased conspicuousness of the shorter scales. This phase is shown remarkably in the cases of such insects as *Cuspidia psi*, *Taeniacampa miniosa*, &c., which become quite dark as they get worn, the shorter scales, which become exposed by the rubbing off of the longer, being in each instance darker than the latter. (3). The colour of the wing membrane. Independently of the scales, a very large proportion of the colour is due to the membrane of the wing itself. Any failure of coloration in the wing membranes must therefore result in an alteration of colour in the same way as must happen when the pigment in the scales fail.

That excessive cold sometimes produces dark coloured specimens appears to be simply a fortuitous circumstance, for whilst the specimens of *Vanessa polychloros* exhibited became darker by the application of a low temperature, the dark brown-black specimens of *Araschnia levana* var. *prorsa* (summer brood) reverted to the paler fulvous form (*levana* type) which occurs as the spring brood. This is exactly what might have been expected, for the failure of pigment in the genus *Vanessa* appears always to throw up conspicuously the darker ground colour of the wings, whilst in *A. levana* the reduction of the intense black-brown of *prorsa* to the fulvous colour in *levana* is exactly in accordance with the genetic sequence suggested in *Vars. of Brit. Noctux*, vol. II., pp. xii-xiii.

THE HISTORY OF BUTTERFLY CLASSIFICATION.

By F. J. BUCKELL, M.B.

The history of butterfly classification and of the origin and varying application of generic names is a subject quite large enough for one evening's consideration and one that presents not a few points of interest. It may conduce to lucidity, if at the outset I define the sense in which, throughout this paper, certain terms will be employed. I shall speak of Papilionids as comprehending Swallow-tails, Whites and Yellows; of Nymphalids as inclusive of Nymphs and Satyrs, Nymphs consisting of Fritillaries and Vanessas with the White Admiral and Purple Emperor, while Satyrs will include the Marbled White, the Meadow Browns and their kindred; lastly Lycaenids will be used as embracing Hair Streaks, Blues and Coppers.

Linnæus is again our starting-point. At first he included the whole of the Lepidoptera under the generic designation *Papilio*, but

afterwards restricted the use of this name to the butterflies. The great Professor soon recognised the necessity of dividing these into groups, but made several attempts before he reached his final conclusions. In the second edition of the *Systema Naturæ* (1740) he placed first, and by themselves, those butterflies which have only four legs (Nymphalids), the rest he distributed among four groups according to the character of the wings. In the *Fauna Suecica* (1746) he only made two groups, the first composed of those which had four serviceable legs, the other of those with six. Two years later, in the sixth edition of the *Systema*, he divided each of these groups into two according as their wings were angled or rounded. In all these earlier attempts the Nymphalids are placed first, but when we come to the tenth edition (1758) in which his final conclusions are embodied they have given place to the Papilionids. In this last-mentioned work Linnæus divided the genus *Papilio* into five groups, which correspond, to a large extent, with those which in later times have received the designation of families, basing his classification upon superficial characters furnished by the imago. First came *Equites*, consisting entirely of the Swallow-tails and their allies, and sub-divided into *Troes* and *Achivi*; next followed *Heliconii* in which the only British species are *cratægi* and the doubtfully indigenous *apollo*; then *Danai*, sub-divided into *Candidi* containing the Whites and Yellows, and *Festivi*, the only indigenous species in which is *hyperanthus*; next came *Nymphales*, sub-divided into *Gemmati* containing the remaining Satyrs as well as *io*, *cardui* and *iris*, and *Phalerati* containing the rest of the Nymphs; the last group was called *Plebei* and was sub-divided into *Eurales*, constituted of *Lyconids*, and *Urbicolæ* of Skippers. It is interesting to note thus early the separation of *cratægi* from the other Whites, and of *hyperanthus* from the Satyrs.

Already however, in his English Moths and Butterflies published in 1749, Benj. Wilkes had propounded a classification of Lepidoptera, based upon the larvæ. He placed the butterflies last and divided them as follows:—*A.* Smooth Caterpillars without protuberances (*machaon*, *rhamni*); *B.* Caterpillars having little hair—1. Producing round-winged butterflies (Whites), 2. Producing scalloped-winged butterflies (Satyrs), 3. Producing butterflies with large heads and bodies (Skipper); *C.* Caterpillars armed with spikes, whose pupa hangs by the tail (*Vanessas* and *Fritillaries*); *D.* Caterpillars shaped like wood-lice (Hair-streaks). At the end, under the heading "Caterpillars producing butterflies whose generation is unknown," which I suppose means that he had not found the larvæ, are placed the Blue Argus and the Purple Highflifer. In 1762, Geoffroi, of Paris, adopted the two groups of the *Fauna Suecica*, but sub-divided the former into three, as follows:—*A.* Species with a spiny larva and angulated wings (*Vanessas*); *B.* Species with a spiny larva and rounded wings (*Fritillaries*); *C.* Species with a smooth larva and with the front wings of the imago short but not tippet-like (Satyrs).

Moses Harris was the first to give generic value and generic names to the groups into which he divided the British species. His scheme of classification was set forth in *An Essay preceding a Supplement to the Aurelian*, which is undated, but which, from internal evidence, seems to have been published about 1775; the work, however, never seems to have become widely known. Taking the neuration of the wings as his

basis, he constituted eighteen named genera, and gave a diagram of the neururation of each. Speaking in the light of present opinions, his genera are all homogeneous, with the single exception that he did not differentiate *lucina* from the Melitæas, but, as we shall see, the true relations of this species remained long unrecognised. In many points he reached conclusions which were not generally arrived at till long after; thus he established separate genera for *rharni*, *cardamines*, *sinapis* and *cratægi*, and distinguished *malvæ* and *tages* from the other skippers. In the *Vienna Catalogue* (1776) the butterflies are placed after the moths. The authors of this work based their scheme of classification on the characters of the larvæ. They created two main groups, the first comprising the species with ordinary-shaped larvæ, and the second those with woodlouse-shaped larvæ. The first group was divided into eleven sections, as follows:—1. Skippers; 2. *Apollo*; 3. Swallow-tails; 4. Whites; 5. Yellows; 6. Satyrs; 7. *Iris*; 8. *Sibylla*; 9. Vanessas; 10. Argynnes; 11. Melitæas with *lucina*. Their second group was divided into three sections, corresponding to the Coppers, Blues and Hair-streaks. The entire dissociation of the Skippers from the Lycænids in this scheme is in marked contrast with their close approximation by Linnæus, whilst the differentiation of the Blues from the Coppers was not generally adopted till a much later period. In 1777 Scopoli published *An Introduction to Natural History*, in which he arranged the butterflies in six named classes, many of which were divided into sub-classes indicated by letters. His basis was the wing-markings, but his result was a veritable “*reductio ad absurdum*”; *iris* and *pamphilus* are together in one sub-class, *machaon* and *quercus* in another, *brassicæ*, *antiopa*, *sibylla* and *malvæ* in a third, and *rharni*, *argiolus*, *rubi*, *phlæas* and *tages* in a fourth. In 1788 with Borkhausen we return to paths of common sense. He created six Hordes or Tribes. The first of these, corresponding to the Nymphalids, was divided into four families, of which the first corresponds to the Vanessas with *iris* and *sibylla*, the second to *Argynnis*, the third to *Melitæa* and the fourth to the Satyrs. The second Horde comprised two families, the first containing the Swallow-tails, and the second *apollo*; his third Horde contained no European species; the fourth contained the Whites and Yellows; the fifth comprised the Lycænids and had three families, one for the Hair-streaks, another for the Coppers, and a third for the Blues, which were divided into two lines; his last Horde was composed of the Skippers.

With Fabricius we arrive at one of the marked epochs of the history. In his earlier works he followed the arrangement of Linnæus, with the exception that he divided *Heliconii* into two groups, retaining the name for the first and giving to the second, in which he placed *apollo* and *cratægi*, the name *Parnassii*. In 1793 in the *Entomologia Systematica*, however, he made a separate genus for the Lycænids and Skippers, giving to it the name *Hesperia*; he also revised the groups of *Papilio* and added the group *Satyri*, in which he placed the Satyrs together with *sibylla* and the Melitæas. Before his death he had prepared a much more elaborate scheme of classification under the title of *Systema Glossatorum*, but it is doubtful whether this was ever published, and our knowledge of its contents is derived from the abstract of it which appeared in *Illiger's Magazine* in 1807, and of which there is a translation in *The Philosophical Magazine* for February,

1830. In it Fabricius created forty-one genera, but did not group them into families. A great many of the generic names which are in use to-day had their origin in this work. Such are *Apatura*, *Limenitis*, *Cynthia*, *Vanessa*, *Hipparchia*, *Argynnis*, *Pontia*, *Colias*, *Melitæa*, *Lycæna*, *Thecla*, *Thymele* and *Pamphila*. The Blues and Coppers were united in the genus *Lycæna*, but the Hair-streaks were placed in the distinct genus *Thecla*. The Skippers were divided into three genera, *Thymele* containing *tages*, and *Pamphila* the remainder of our indigenous species. *Hesperia* was now used as the name of a genus the only British species in which is *baetica*. Meanwhile Schrank, a Bavarian clergyman, had been moving independently in the same direction. In his *Fauna Boica*, published in 1801, he adopted the arrangement and groups of the *Vienna Catalogue*, but gathered the latter into five named genera, with sub-genera indicated by letters. The Skippers he called *Erynnis*; the Papilionids *Pieris*; the Satyrs (with *iris*), *Maniola*; the Nymphs, *Papilio*; and the Lycænids, *Cupido*.

Latreille, whose influence upon classification has been very great, next demands our attention, and it is well to bear in mind his intimate relations with Fabricius. In 1805, he applied to the butterflies as a whole the name of *Diurna* and divided them into eight genera, placing the Nymphalids first under the name *Nymphalis*. His next genus does not concern us; then followed *Danaiida* (*archippus*); *Papilio*, which he was the first to restrict to the Swallow-tails; *Parnassius* (*apollo*); *Pieris* (Whites and Yellows); *Polyommatus* (Lycænids) and *Hesperia* (all the Skippers). Four years later, still maintaining the same arrangement, he constituted two families which he named *Papilionides* and *Hesperides*, the latter limited to the Skippers. He also gave elaborate indications for the breaking up of his larger genera and introduced some of the Fabrician names, and in addition substituted *Danaus*, which, in the *Encyclopédie Méthodique*, (1819), was altered to *Danaïs*, for *Danaiida*. In the next year (1810), in his *Considérations Générales*, he completely altered the arrangement and placed the Papilionids first, followed by *Danaus*, the Nymphalids and the Lycænids, the Skippers remaining at the end; to this arrangement he adhered in his later works. In this work *Satyrus* appears for the first time as the generic name of the Satyrs. In 1815, in the ninth volume of the *Edinburgh Encyclopædia*, we reach the next British contribution. This was the work of Dr. Leach, who ultimately became Assistant Keeper of the Natural History Department of the British Museum. Leach adopted Latreille's second plan as his model, but in Samouelle's *Useful Compendium*, published four years later, the names of the two main groups are changed, on his authority, into the form to which we are now accustomed as the designation of families *Papilionidæ* and *Hesperidæ*. *Papilionidæ* he further divided into *Papilionida* and *Lycænida*. In his use of generic names he followed Fabricius rather than Latreille, but he was the first, after Harris, to place *rharni* in a distinct genus, for which he established the name *Gonepteryx*.

The year 1816 was memorable in the history of classification, having witnessed the publication of no less than three important contributions to the subject. One of these was by Ochsenheimer, another by a Swedish doctor named Dalman, and the third, the most important of all, by Jacob Hübner. Ochsenheimer did not group his genera in any way. His arrangement was:—Nymphs, Satyrs, Lycænidæ, Papilionidæ,

Skippers. He divided the genus *Vanessa* into three families, placing *cardui* and *atalanta* in A and the rest of our species in B, and although he still included all the Satyrs in the single genus *Hipparchia*, he divided this into families which pretty nearly agree with our present generic distribution. Dalman, adopting Latreille's two main groups, divided the first into two unnamed sections; the first of these comprises the Nymphalids, the second the Papilionids and Lycænids. The first section is in two divisions, corresponding with (a) Nymphs, (b) Satyrs; the second in three, corresponding with (a) Swallow-tails, (b) Whites and Yellows, (c) Lycænids, the latter being all included in the genus *Zephyrus*, which, however, has three named sub-divisions; these are *Aurotis* (Hair-streaks), *Heodes* (Coppers with *rubi*), and *Cyaniris* (Blues), the latter being in two sub-sections. Dalman partly adopted Fabrician names for his genera, of which there were ten in all, and partly coined new ones; of the latter, *Erebia* is the only one that has come into general use. Hübner, in his *Verzeichniss bekannter Schmetterlinge* went in for a much more extensive creation of genera than any of his predecessors or contemporaries. He dealt with some 1500 species, and as few of his genera contained more than five or six species it will be evident that the number of them was very great. In the case of the Satyrs, the eleven species which occur in Britain are distributed over four families and ten genera. Hübner's main divisions were two in number; *Nymphales* the equivalent of the Nymphalids, and *Gentiles* which included the rest. The *Nymphales* were divided into nine, and the *Gentiles* into six named divisions called Stirpes, and these were again sub-divided into families. The order of arrangement was: Nymphs, Satyrs, Lycænids, Papilionids, Skippers. Hübner was the first to recognise the generic distinctness of *Lucina*, for which he created the genus *Hamearis*, but he still retained this among the *Nymphales*; he was also the first to break up the Satyrs, and to him we owe the names *Epinephele*, *Pararge*, *Arge*, *Enodia* and *Cænonympha*; he placed *hyperanthus* in a different family from *ianira* and *tithonus*, and went further than Dalman, by establishing the separate genus *Chrysophanus* for the Coppers; he also anticipated Stephens by ten years in placing *sinapis* in a separate genus, to which he gave the name *Leptosia*. To Hübner also we are indebted for the names *Pyrameis*, *Lampides*, *Bithys*, *Aporia*, *Euchlœe*, *Nisoniades*, *Pyrgus*, *Cyclopides* and *Thymelicus*. This important work was not widely known at the time, and it was a quarter of a century before it began to exert much influence, and then mostly in this country, on generic nomenclature. It should be mentioned here that Scudder gives reasons for thinking that it appeared in parts and was not completed till 1827.

In 1827, Swainson, in an article in the *Philosophical Magazine*, insisted upon the importance of taking the characters of the pupa into account in determining the natural affinities of the *Diurna*, and established five families thus arranged: *Nymphalidæ*, *Papilionidæ*, *Hesperidæ*, *Polyommaticæ* (equivalent to the *Lycænida* of Leach) and *Heliconidæ*, the last not containing any British species. In the following year Horsfield, an American who had formed a fine collection in Java, published a catalogue of his lepidoptera. He also divided his butterflies into five groups which he called Stirpes and arranged them Lycænids, Papilionids, Nymphs, Satyrs, Skippers. In 1827-8 Stephens in his *Illustrations of British Entomology* adopted

Swainson's four families, substituting the name *Lyceuidæ* for the *Polyommata* of that author, and altering the arrangement to *Papilionidæ*, *Nymphalidæ*, *Lyceuidæ*, *Hesperidæ*. In the main he used the same generic names as Leach, but separated *crataegi* from the other Whites, adopting Schrank's name *Pieris* for it; he united *daptidice* and *cardamines* in the genus *Mancipium*, attributing the name to Hübner, with whose *Verzeichniss*, however, he was not at that time acquainted. He created the genera *Leucophasia* for *sinapis*, and *Nemeobius* for *lucina*, which, however, he still retained in the *Nymphalidæ*, restricted *Lyceus* to the Coppers and *Polyommatus* to the Blues, and adopted the Fabrician genera for the Skippers, shifting *malva*, however, to *Thymele*. 1829 was again a prolific year, Curtis in this country, Meigen in Germany, and, more important than either, Boisduval in France, having published systematic lists therein. Curtis in the main agreed with Stephens but did not group the genera into families, and made the Satyrs precede the Nymphs. He placed *lucina*, for which he used Hübner's name *Hamearis*, at the end of the Nymphs and adopted one genus only for the Skippers. The point of interest about Meigen is that he was the first, after Hübner, to divide the Satyrs, creating the genus *Melanargia* for *galathea* and other kindred species, and applying Schrank's name *Maniola* to the rest. Boisduval, like Latreille, made several experiments in classification; he was one of those who recognised that a scientific scheme must be based upon a consideration of all the stages of the insect, and not merely upon the superficial characteristics of the imago. In the *Index Methodicus* of 1829, he in the main followed Latreille, making, however, three main groups instead of two:—*Papilionidi*, *Nymphalidi* and *Hesperidi*. In 1832, he created the genus *Steropes* into which he afterwards placed *paniscus*. In 1833, he coined the name *Rhodocera* for *rharni*, rejecting Leach's earlier name on the ground of its similarity to *Gonoptera*. In the *Icones Historiques* published 1832-4, he substituted the name *Rhopalocera*, the French equivalent of which had been proposed by Dumeril in 1806, for the *Diurna* of Latreille. In this work he changed the names of his three main groups to *Succincti*, *Penduli* and *Involuti*, names derived from the mode of pupation. *Succincti* is divided into *Papilionidi* and *Lyceuidi*; *Penduli* into *Danaidi*, *Nymphalidi* and *Satyridi*; whilst *Involuti* is constituted of the single tribe *Hesperidi*. As regards generic names, he restricted *Polyommatus* to the Coppers, and used *Argus* for the Blues; *Satyridi* was divided into *Arge* (*galathea*), *Erebia* (*medea* and *epiphron*) and *Satyrus*; in *Hesperidi* he created the genera *Syrichthus* and *Thanaos*. The first volume of the *Histoire Naturelle* (1836), the only one published by Boisduval, marks the establishment of the distinct tribes *Pierides* and *Erycinides*, the latter being the first recognition of the profound difference between *lucina* and the insects with which it had hitherto been classed. In this work also the genus *Anthocharis* was created for *cardamines*. The changes introduced in his later work, the *Genera et Index Methodicus* (1840), are the creation of the tribe *Apaturides*, and the substitution of *Lyceus* for *Argus* as the generic name of the Blues; indications are also given for the sub-division of many of the genera. Boisduval nowhere shows any sign of acquaintance with Hübner's *Verzeichniss*. In 1837, Donzel, a French entomologist, separated *crataegi* from the other Whites, one of his grounds for so doing being the fact that, whilst in them the male carried the female during copulation, in *crataegi* the reverse

obtained. He coined the name *Leuconea* for the separated species. In 1840, in his *Introduction to the Modern Classification of Insects*, Westwood adopted the two main divisions of Latreille but renamed them *Nudi* and *Involuti* from their pupal characteristics. *Nudi* was divided into five families: I. *Papilionidæ*, sub-divided into *Papilionides* and *Pierides*; II. *Heliconidæ*; III. *Nymphalidæ*, sub-divided into *Nymphalides* and *Hipparchiides*; IV. *Erycinidæ*; V. *Lycenidæ*. As regards generic names, he in the main followed Stephens, but separated *cardui* from the *Vanessas* under the Fabrician name *Cynthia*, and used Hübner's name *Hamearis* for *lucina*. In Westwood and Humphrey's *British Butterflies* (1841), *Euchlœe* and *Aporia* were adopted, and the *Satyr*s were broken up into *Arge*; *Lasioommata*, a new genus created for *megæra* and *cægeria*; *Hipparchia*; *Coenonympha* and *Oreina*, which replaced the older *Erebia*. *Chrysophanus* was substituted for *Lycæna* as the generic name of the Coppers, and the Skippers were thus arranged: *Pyrgus* (*malvæ*). *Nisoniades* (*tages*), *Cyclopides* (*paniscus*), *Pamphila* (*comma*, &c.) The influence of Hübner's *Verzeichniss* is very evident in this latter work.

In 1843 Herrich-Schaeffer in his *Systematische Bearbeitung* divided the Rhopalocera into nine families, which are arranged in the following order:—*Nymphalidæ*, *Danaidæ*, *Satyridæ*, *Libytheidæ*, *Erycinidæ*, *Pieridæ*, *Lycenidæ*, *Papilionidæ*, *Hesperidæ*. The *Satyr*idæ were broken up into the following genera:—*Arge*, *Erebia*, *Satyrus* (*semele*), *Epinephele* (*hyperanthus*, *tithonus*, *ianira*), *Coenonympha* and *Pararge*, which he spells *Pararga* (*megæra* and *cægeria*). Herrich-Schaeffer included *crataegi* with the other whites in *Pieris*, but placed *daplidice* in *Anthocharis* with *cardamines*; he applied *Lycæna* to the Blues, and *Polyommatus* to the Coppers, and placed all the Skippers in the single genus *Hesperia*. He was the first to follow Hübner in placing *semele* in a separate genus. There is a later work of Herrich-Schaeffer, the *Prodromus Systematis Lepidopterorum*, in which a much more elaborate classification is set forth.

In 1844 Duponchel published a *Catalogue Méthodique des Lépidoptères d'Europe*. He adhered to Latreille's two main groups, but divided the first into two sections, section 1 comprising the tribes *Danaidæ*, *Argynnidæ*, *Vanessidæ*, *Libytheidæ*, *Nymphalidæ* (restricted to *Limenitis* and *Apatura*) and *Satyridæ*; whilst section 2 was composed of tribes *Papilionidæ*, *Parnassidæ*, *Pieridæ*, *Rhodoceridæ*, *Lycenidæ* and *Erycinidæ*. Duponchel expressed his preference for the characters of the imago as the basis of classification, and his disagreement with Boisduval's practice of taking the other stages of the life history into consideration. It will be noticed that he placed the Nymphalids first. In 1846 Edward Doubleday began, in conjunction with Hewitson, the publication of the *Genera of Diurnal Lepidoptera*, which was completed after his death by Westwood, the final part appearing in August, 1852. Doubleday established fifteen families, of which those containing British species were thus arranged:—*Papilionidæ*, *Pieridæ*, *Danaidæ*, *Nymphalidæ*, *Satyridæ*, *Erycinidæ*, *Lycenidæ*, *Hesperidæ*. He separated *c-album* from the *Vanessas*, adopting for it the name *Grapta*, which had been given as a generic name to an allied American species by Rev. Wm. Kirby in 1837; *atalanta* and *cardui* were placed together in another genus, to which Hübner's name *Pyrameis* was applied. He followed Westwood in using *Chrysophanus* for the Coppers, but preferred *Lycæna* to *Polyommatus* for the Blues.

In 1850 Stephens, who had by that time become acquainted with Hübner's *Verzeichniss*, embodied in *The List of the Specimens of British Animals in the collection of the British Museum : Part v. Lepidoptera*, his later ideas on the subject of classification. He placed *Papilionidæ* first, sub-dividing it into *Papilionidi*, *Rhodoceri* and *Pieridi*; *Nymphalidæ*, which came next, was sub-divided into *Satyridi*, *Nymphalidi* (limited to *Limenitis* and *Apatura*), *Vanessidi* and *Argynnidi*; then followed *Erycinidæ*, *Lycaenidæ*, *Hesperidæ*. Stephens was the first after Hübner to place *hyperanthus* in a separate genus, for which he used that author's name *Enodia*; he made many other changes in the limits and designations of the genera of his earlier work, the influence of the *Verzeichniss* being very patent; the "resurrection-man" was no bogey to Stephens. 1850 also saw the completion of the first edition of Henry Doubleday's list. In this no attempt was made to group the genera; the arrangement is that set forth by Boisduval in 1840. Two or three alternative generic names are often given; if the one that is placed first is to be taken as Doubleday's choice, then he followed Boisduval with these substitutions: *Gonepteryx* for *Rhodocera*, *Chrysophanus* for *Polyommatus*, and *Pamphila* for *Hesperia*.

In 1852 Julius Lederer published in the *Proceedings of the Zoologico-botanical Society of Vienna* an "attempt to arrange the European lepidoptera in the most natural succession." His arrangement was that of Boisduval, but he placed the *Erycinidæ* in a distinct group separate from the other tribes of Boisduval's *Succinctæ*. He also revived the old Linnæan name *Equites* in substitution for *Papilionidæ*, and included *Apatura* among the *Nymphalidæ*. He adopted Herrich-Schaeffer's generic nomenclature save that he used *Hipparchia* for *galathea*, established a separate genus for *paniscus*, to which he gave the uncouth name *Carterocephalus*, and replaced *daplidice* in *Pieris*. In 1857 Stainton in the *Manual* followed Stephens' British Museum List with these differences. He rejected the sub-family *Rhodoceri*, placing the Yellows in *Pieridi*; used *Anthocharis* and not *Euchlœ*; did not separate *hyperanthus* from *ianira* and *tithonus*; and adopted for Skippers *Thymele*, *Thanaos* and *Steropes* in place of the Hübnerian names used by Stephens, agreeing, however, with the latter in the use of *Pamphila*. In 1858 Rambur published a *Catalogue of the Lepidoptera of Andalusia*, in which the *Rhopalocera* were divided into two tribes, *Papilioniens* and *Hespériens*. The former was subdivided into eight families, of which the six that concern us were thus arranged:—*Nymphalides*, *Satyrides*, *Erycinides*, *Lycaenides*, *Pierides* and *Papilionides*. The genera of *Satyrides* were *Arge*, *Pararga*, *Hipparchia* (*ianira* and *tithonus*), *Coenonympha*, *Erebia* and *Satyrus* (*semele*). Donzel's *Leuconea* was used for *crategi*, as it had been by Duponchel, and several new generic names adopted for Skippers, among them *Scelotrix* for *alveolus*, and *Heteropterus*, a name taken from Dumeril, for *sylvanus*, &c.

In 1859 the second edition of Henry Doubleday's list appeared; this differed considerably from the earlier edition. The genera were now grouped into families which were thus arranged:—*Papilionidæ*, *Pieridæ*, *Rhodoceri*, *Vanessidæ*, *Nymphalidæ*, (limited to *Limenitis* and *Apatura*), *Satyridæ*, *Lycaenidæ*, *Erycinidæ*, and *Hesperidæ*. The change of position of the *Lycaenidæ* is to be noticed. *Satyrus* was made to include *ægeria*, *megæra*, *semele*, *ianira*, *tithonus* and *hyperanthus*; *Polyommatus* was now applied to the Coppers and *Lycaena* to the Blues; for

davus and *pamphilus* what, according to Kirby (*E. M. M.*, viii., p. 42), was only a MS. name of Guenée's, *Chortobius* was adopted. I have never met with this name in any other systematic work, and in his later supplement Doubleday replaced it by *Cænonympha*. In 1861 Staudinger's first catalogue was published, but as there is no substantial difference, from our present point of view, between it and the second, it may be passed over. In the same year Bates "of the Amazon" propounded his views of classification in the *Journal of Entomology*. He maintained that the differences between the existing families were of very unequal value; that for example the difference between *Pieridæ* and *Papilionidæ* was much less than that between either of them and *Hesperiidæ*. He accordingly proposed to constitute five families, and to subdivide three of them into sub-families with names ending in *inæ*. In 1861 he arranged his families thus—*Hesperiidæ*, *Papilionidæ*, *Lycænidæ*, *Erycinidæ* and *Nymphalidæ*. Three years later, in what he speaks of as a more matured plan, the arrangement is exactly reversed. He divided *Nymphalidæ* into six sub-families, only three of which, *Danainæ*, *Satyrinæ* and *Nymphalinæ*, contain British representatives; *Erycinidæ* into three, and *Papilionidæ* into two, *Pierinæ* and *Papilioninæ*. In 1867 he recast *Erycinidæ*, and gave to that one of the three sub-families which contains the solitary indigenous representative of the family, *lucina*, the name of *Nemeobiinæ*. In 1869 A. G. Butler, in a *Catalogue of the Insects described by Fabricius contained in the British Museum*, adopted Bates' system, but enlarged the number of sub-families by dividing *Lycænidæ* into *Lycæninæ* (Blues and Coppers) and *Theclinæ*. In the *Satyrinæ*, *semele* and *hyperanthus* are placed together in the genus *Hipparchia* but for the latter the sub-generic name *Satyrus* is used; *ægeria* and *megæra* are in separate genera, *Pararge* being used for *ægeria* and *Amecera*, a name introduced by the author two years previously, for *megæra*. *Nymphalinæ* is divided into ten groups, of which only *Apaturæ*, *Limenitides*, *Vanessides* and *Argynnides* have British representatives. Butler separated *bœticus* from our other Blues under the Hübnerian name *Lampides*, and used *Lycæna* for the remainder, and *Chrysophanus* for the Coppers; he divided the Hair-streaks into two genera, *Thecla* being applied to *quercus* and *betulæ*, and *Bithys*, another Hübnerian name, to the rest. He followed Westwood in adopting the Hübnerian *Leptosia* in place of *Leucophasia*, and used *Pamphila* (*sylvanus*), *Cyclopides* (*paniscus*), *Pyrgus* (*malvæ*), and *Nisoniades* (*tages*).

The year 1871 brings us to Newman, Staudinger and Kirby. Newman adopted Boisduval's three main groups founded on the mode of pupation, but placed the *Pendulæ*, which he called *Suspensi*, before the *Succincti*. He divided his *Suspensi* into *Spinigeri*, those with spine-bearing caterpillars, and *Limaciformes*, those with slug shaped caterpillars; and his *Succincti* into *Onisciformes*, those with wood-louse shaped caterpillars and *Cylindracei*, those with cylindrical larvæ. He also changed Boisduval's name *Involuti* to *Celantes*, and combined the *Erycinidæ* and *Lycænidæ* in the same natural order. As regards generic names, *Grapta* was used for *c-album*, and *Pyrameis* for *atalanta* and *cardui*; the *Satyrid* genera are—*Melanargia* (*Melanagria*), the first instance of the name in this country; *Erebia*; *Pararge* (*Pyrarga*); *Satyrus* (*semele*); *Epinephele*; and *Cænonympha*. *Polyommatus* was applied to the Coppers and *Lycæna* to the Blues, *bœtica* being, however, separated under *Lampides*;

Rhodocera and *Anthocharis* were retained, *Aporia* used for *cratægi*, and the Skippers all included under *Hesperia*. Staudinger in the main followed Lederer, but made the additional family *Apaturidæ*, and adopted the uniform terminal *idæ* for the names of families. He also separated *cratægi* under *Aporia*, used *Melanargia* instead of *Arge*, and separated *malvæ* and *tages* from the other Skippers under the respective names of *Syrichthus* and *Nisoniades*. Kirby followed Bates, placing Nymphalidæ first, but he substituted the name *Lemoniidæ* for *Erycinidæ*. In generic names he made many changes. Including in our survey his supplement of 1877, we find that he replaced *Erebia* by *Maniola*, used *Satyrus* for *ægeria* and *megæra*, and united *semele* and *hyperanthus* under *Hipparchia*. He divided the Hair-streaks into two genera *Zephyrus* (*betulæ* and *quercus*) and *Thecla*, applied *Lycæna* to the Coppers, and resuscitated the old Linnaean name *Plebeius* for the Blues. In Hesperiidæ he applied *Hesperia* to *malvæ*, *Nisoniades* to *tages*, *Heteropterus* to *palaemon*, and separated *comma* and *sylvanus* from *thaumas*, *lineola* and *actæon*, calling the former *Pamphila* and the latter *Thymelicus*.

In 1888-9 Scudder, in the most scientific work on Rhopalocera which has yet appeared, *The Butterflies of the Eastern United States and Canada* went at considerable length into the question of classification. He constituted four families, placing Nymphalidæ first, followed by *Lycenidæ*, *Papilionidæ* and *Hesperidæ*. Nymphalidæ was divided into four sub-families *Satyrinæ*, *Nymphalinæ*, *Euplœinæ* (the equivalent of Bates' *Danainæ*) and another. *Lycenidæ* is in two sub-families *Lemoniina* and *Lycæninæ*, the former the equivalent of the older *Erycinidæ*, the latter of the *Lycenidæ* of most authors. *Papilionidæ* is divided into *Pierinæ* and *Papilioninæ*. The sub-families *Nymphalinæ*, *Lycæninæ*, and *Pierinæ*, and the family *Hesperidæ* are further subdivided into tribes with names ending in *idi*.

In his *History of our British Butterflies*, published in 1890, Mr. Dale adopts Boisduval's system, but arranges the families of the second tribe, *Pendulæ*, thus: *Satyridæ*, *Danaidæ*, *Apaturidæ*, *Nymphalidæ*. As regards generic nomenclature; in the Papilionids he adheres to Doubleday's of 1859, save that he separates *cratægi* under *Aporia*; in *Lycenidæ* he uses *Chrysophanus* for the Coppers, and *Polyommatus* for the Blues; in *Satyridæ* his genera are *Melanargia*, *Hipparchia*, *Cænonympha*, and *Erebia*; *Hipparchia* being divided into sub-genera, as follows:—*Lasiommata* (*ægeria*, *megæra*) *Hipparchia* (*semele*), *Satyrus* (*ianira*, *tithonus*), *Enodia* (*hyperanthus*); his Skipper genera are *Cyclopidæ*, *Hesperia*, *Syrichthus*, *Nisoniades*.

The first volume of *The Lepidoptera of the British Islands* by C. G. Barrett, published in its completed form so recently as the spring of the present year, brings our history up to date. Mr. Barrett adopts the same nine families as Mr. Dale, but does not group them; his arrangement is also the same, except that the four families of Mr. Dale's second tribe are placed in the following order: *Apaturidæ*, *Danaidæ*, *Nymphalidæ*, *Satyridæ*. Mr. Barrett's generic nomenclature is also in the main the same as that of Mr. Dale, but he separates *betica* and *argiades* from the other Blues under the generic name *Lycæna*, and breaks up Mr. Dale's *Hipparchia* into *Satyrus* (*semele*), *Pararge* (*ægeria*, *megæra*), and *Epinephele*, including *hyperanthus* in the latter.

We have now traced the way in which classification has progressed from the simple system of pre-Linnaean times to the complex one of

to-day, and have doubtless felt a thrill of patriotic pride at the important contributions of our own countrymen to its development. We have noted the existence from the earliest times of two conflicting opinions as to the basis upon which classification should rest, one section of authors being content with the superficial characteristics of the imago, whilst another, growing in numbers as knowledge became more profound and extensive, have insisted that a true scientific basis is alone to be found in the entire life history. We have seen that considerable differences of opinion have been manifested as to the order in which the several groups should be arranged, some regarding the *Nymphalidæ*, others the *Papilionidæ*, as the most highly developed and therefore as entitled to the post of honour. Most of the authorities have placed the *Lyceidæ* between the *Papilionidæ* and the *Nymphalidæ*, and there has been a very general agreement that the *Hesperiidæ* differ profoundly from the rest, and that of all the *Rhopalocera* they approach nearest to the *Heterocera*. We have also seen the single genus of the earlier authors sub-divided into the vast host of the later ones. A genus is a purely artificial creation, and it must needs be that opinions will vary as to its proper limits, some attaching generic value to much smaller differences than do others. In this, as in so many other matters, probably our safest guide will be the old maxim, "medio tutissimus ibis."

LEAD US NOT INTO TEMPTATION

By A COUNTRY COUSIN.

I have been interested in collecting lepidoptera and in observing their habits in the field for many years, but, until last week, I had never attempted to dive into the mysteries of a sale-room where these beautiful insects became objects of barter, or to analyse the men who collected their insects here, in preference to doing so in the field.

However, a big sale was advertised, and I thought I would make a few observations on the insects sold and on the people who bought them. When I arrived, some few hours before the sale was advertised to begin, I found busy people already there, earnestly examining the contents of the boxes, and ticking off on their catalogues the "lots" for which they intended bidding. Following the general example, I examined the insects. Truly this was a grand collection. Rarities! Is there such a thing among the British lepidoptera? *Daphidice*, 13 specimens; *Lathonia*, 20 specimens; *Antiopa*, 16 specimens; *Niobe*, two specimens; *Acis*, 42 specimens; *Dispar*, 31 specimens. Of course *dispar* used to be common, but who captured all these other specimens? Let me see! *P. daphidice*; among others, there are specimens taken by Mr. Button and Mr. Edney; *niobe*, no data given. Were there ever any British specimens except those sent from Canterbury on which Messrs. Newman and Doubleday animadverted so strongly? *Lathonia*, taken among others by Mr. Parry and Mr. Button, whilst we find Mr. Wigan and Mr. Parry responsible for some of the *V. antiopa*. The *acis* are apparently without sponsors. Let us pass on to the *Heterocera*:—*Sphinx pinastri*, three specimens; *D. celerio*, 10 specimens; *D. euphorbiæ*, three specimens; *D. lineata*, 11 specimens; *Sesia andreniformis*, two specimens; *S. scoliformis*, 14 specimens; *S. asiliformis*, five specimens; *Deiopeia pulchella*, eight specimens; *Lasiocampa ilicifolia*,

10 specimens. Now for those responsible for some of these specimens. The *S. pinastri* appear to have no sponsors. Mr. J. B. Hodgkinson seems responsible for most of the *D. celerio* and for one of the *D. euphorbiae*, the other two specimens of the latter being reputed as part of the original stock bred by Mr. Raddon from the Braunton Burrows larvæ. Mr. Hodgkinson is responsible for one of the *D. lineata*, whilst five specimens appear to be without sponsors. No sponsor appears for the *S. andreniformis* and the *S. scoliformis*, whilst Mr. Wigan is responsible for one of the *S. asiliformis* taken in Romney Marsh, the same gentleman also being responsible for a *D. pulchella*, and Mr. Bouchard and Mr. Hodgkinson for others. The *L. ilicifolia* also have to be taken on trust, no one being apparently responsible for their capture. Now we pass to the GEOMETRÆ. The extinct *Cleora viduaria* is represented by 15 specimens; *Boletobia fuliginaria*, by four specimens; *Acidalia herbariata*, by three specimens; *A. strigaria*, by one specimen; *Lythria purpuraria*, 10 specimens; *Sterrhia sacraria*, 12 specimens; *Aplasta ononaria*, four specimens; *Eupithecia innotata*, six specimens; *Phibalapteryx polygrammata*, 20 specimens. *C. viduaria* and *P. polygrammata*, having quite recently become extinct, have no sponsors. *B. fuliginaria* appears to be much in the same condition, but, strange to say, *A. herbariata* is also without friends. Coverdale's specimens are of course in Mr. Tutt's collection, so these are presumably some of Mr. Meek's. *A. strigaria* is placed to Mr. Button's account, so appear to be all the *L. purpuraria*; and he supplied the eggs for some of the *S. sacraria*. What a wonderful collector this man must have been! I was under the impression that a few of the London collectors knew the neighbourhood of Gravesend pretty well, but I suppose I must have dreamt it. Ah! Mr. Rogers, I see, got *S. sacraria*; Messrs. J. B. Hodgkinson and Bouchard being responsible for others. Now for *A. ononaria*, taken by Mr. Piffard in the Warren. "Good old Warren!" I've spent some months there, but never mind, "Good old ononaria!" The *E. innotata* haven't a sponsor, and I believe I found myself saying "Perhaps they are as well without." I'm getting cynical, I declare! Now for the PSEUDOBOMBYCES. *Drepana sicula*, only 17; *D. bicuspis*, 13. Ah! *G. crenata*, only two. Well, I'm rather disappointed. *N. bicolor*, five; and *N. tritophus*, four specimens. *Tritophus*, why I really must apologise, but four specimens, it nearly takes my breath away. Well! who are the sponsors here? *D. sicula* and *D. bicuspis*, do very well without. *N. bicolor*: Mr. Bouchard one, and four from Mr. Chappell from Burntwood. What does that tall gentlemanly-looking man say to his friend as he looks over my shoulder? "Chappell's specimens! Ah! he caught eight didn't he? I wonder how many dozens have been sold for those eight! How many were there in Harper's, Shepherd's, and Vaughan's sales? Have not B—, M—, W—, and a host of others, got some of these eight in their cabinets? Two *G. crenata*! Some of those advertised on the cover of the *Entom.* a few years ago, I suppose! Ah! wasn't that the same year that *T. cineraria* was planted on the oaks in the New Forest! *Tritophus*: one, 'near Gravesend.' I wonder if that is Button's, &c. &c." Well, brothers of the net, you can guess how this (the tone of it even more than the words themselves) took my breath away. Now for the NOCTUÆ: *Bryophila algæ*, two specimens; only two! But by the Holy Turca what's this? 14 *Synia musculosa*, 12 *L. vitellina*, and two *L. extranea*; only two! But here's something to make up for it, *L. l-album*, five, and then 10 *Lophygma exigua*,—

three from the Messrs. Fenn's collection. I wonder whether the Messrs. Fenn's collection ever had three *exigua*, or whether there was only one in it when it was sold? *P. leucophæa*, "fine" says the catalogue. *Luperina guenéei*, two; and *L. dumerili*, one, with another doubtful one; and then four *Hydrilla palustris*. Well I'm glad to see some good, honest, *N. subrosea* once again; 13 of them, eh! and 11 *Cerastis erythrocephala*. Then 18 *Dianthæcia barrettii*. But there are some eye-openers. Three *Hadena satura*, and five *H. peregrina*, whilst here are some *Xylina conformis* "large light var." What does that gentleman say over my shoulder? "Continental type" it sounded like, but I'm not sure; and then two *X. zinckenii*. What is this? *Cucullia artemisiae*, and 12 *C. gnaphalii*. Then comes *Acontia solaris*, four *Micra ostrina*, three *M. paula*, and still further, two *Ophiodes lunaris*, two *Catephia alchymista*, eight *Catocala frazini*, and 14 *Madopa salicalis*. What is this? A *Zanclognatha emortualis*, and there are four *D. ramhurialis*, and two *A. catalaunalis*. "Only reputed British" says a voice over my shoulder again. "But that means a few specimens in every one's collection who is willing to buy," says his companion, "but never mind about that, these *repandalis* are probably right." My breath is nearly gone again. Let us see who are responsible for these. *Musculosa*, well I can't find out; *vitellina*, apparently Mr. Rogers; *L. extranea*, needs no sponsor, but *l-album*, from Mr. Edney. Good old *El Dorado*! Good old cathedral city! and here's *leucophæa* from the same district. What work Messrs. Parry, Wigan and Edney put in in those glorious years 1867 to 1872! I wonder why the district collapsed so suddenly after the letters in the *Entom.* and *E.M.M.* about our lovely Kent specimens. *Guenéei*, original specimens, but how, when and where concerning *dumerili*? *H. palustris*, Mr. Woods and Mr. Weaver; but *C. erythrocephala*, how, when and where again? *Satura*, without data, well that's too bad, but Mr. Wigan takes one of the *peregrina*; who took the others? eh! *Ostrina* and *paula*, Freshwater. Well! what's that Mr. Hodges doing? *Alchymista*, Mr. Harris vouches were taken at Bembridge. Mr. Parry and Mr. Hodgkinson become responsible for some of the *C. frazini*, but rare PYRALIDES don't need any sponsors. Well! I've had a liberal education during the last few hours. I've been in the fields all my life, but what odds on Messrs Button, Edney, Wigan and Parry, from 1867 to 1872? What's become of them? Now let us have a look and listen to the talk of these deep-thinking scientists, scattered about the room.

Ah! here's a man I've met out in the woods. Tall and thin, with bent shoulders, whose appearance suggests the midnight oil and who I know hasn't money enough to buy. "Come to have a look round," he says to me, and then in answer to a query of mine he replies, "Who are all these people? I don't know. I've seen some of them before. Tall, thin old gentleman over there? Said to have the finest collection of rarities and varieties in the country, picks them up here chiefly from old collections which are sold without much advertisement and when there is but little competition. Two tall men yonder about five-and-thirty or a little more? Both got plenty of money. Elder one has a magnificent collection, one of the best micro collectors in the country, his younger friend almost as good a man, buying very largely just now. That strongly built young fellow just joined them? Yes! he knows how to use his strength too; I saw him once accidentally topple a six-foot Maori over his head at Blackheath—splendidly keen lepidopterist

for all that! Two middle-aged men chatting yonder? Yes! mad on varieties both of them, the one nearest to us gave fifteen pounds for a variety of *caia* once. The elder of the three yonder? Yes, a great friend of mine. Probably come to buy some of the things back which were sold in his own collection years ago. Two rather short men? They are the main supporters of one of the London societies and the dark haired good-natured looking fellow yonder does the same for an opposition society. The men in yonder corner? They're the professional element. Buy on commission for some of our rich collectors. That one probably has a commission from one of the Rothschilds."

But the sale begins—*A. crataegi* are worth money in spite of the foreign influx; *P. daplidice*, a pair including one from Mr. Button fetch £2 12s. 6d., whilst another pair including one from Mr. Parry fetch £1 7s. 6d., so they vary in price. It does not seem to matter who captured *lathonia*, they fetch nearly a pound a pair, whilst *antiopa* averages about £1 apiece, although a pair including one of Mr. Wigan's goes for a pound. Then come *C. dispar* 18 specimens, which fetch £80, the highest prices being, for males £6 10s., £5 15s., and £5, for females £6 10s., £6, £5 15s., £5 5s., whilst the lowest price is £2 10s., for an underside; 40 *P. acis* produce £17 10s., whilst four vars. of *A. euphrosyne* produce £3 15s., two others £5, a nearly black *M. athalia*, £2 15s.; two nearly black *L. sibylla*, £1 15s. each, and a banded *L. megara*, £3. The rare Sphinges, considering the loads they must be on the men's minds who buy them with all their doubts and imperfections, fetch remarkable prices, the extreme point of reckless enthusiasm (Please forgive this expression of feeling.—Ed.) being reached when £6 16s. 6d. is given for one, and £6 6s. for a second specimen of *D. euphorbiae* because they were reputed to have come from Mr. Raddon, a drop to £3 13s. 6d., the price given for a third, being apparently the market appreciation between the veracity of the latter gentleman and that of a Mr. Dewhirst. Then comes £1 15s. for a *lineata*, and to cap this £2 2s. for two *S. asiliformis*, one of which is the Romney Marsh specimen. Whew! What's that old proverb about the parting of a certain class of people and their money? A little variation on the appreciation of veracity occurs again with *D. pulchella*, and then comes £10 for a black *dominula*; varieties of *A. caia*, *A. villica*, &c. produce spirited competition, £4 15s. for two *villica* vars. and £2 5s. for a *caia* being the highest prices; *L. cœnosa* appears to be valued at about 25s. per pair, and *L. ilicifolia* at £3 10s. for four. *Cleora viduaria* produces three guineas for four, and I wonder whether it was the one *herbariata* or the one *osseata* that produced £1. All the lots with *circellata* went up very high, but Mr. Button's *strigaria* and 53 other specimens went for 6s. Fie! you bidders, who give pounds, (£2 12s. 6d.) for Mr. Button's *daplidice* and Mr. Button's *lathonia*; but worse follows, for three of Mr. Button's *purpuraria* and three *sacraria*, bred from eggs obtained from that gentleman, go for nine shillings. How are the mighty fallen! The four *ononaria* fetch a sovereign. This allows a large margin for conscience as I suppose a genuine British *ononaria* would be unique. *Polygrammata* go as high as £2 15s. for four, whilst *C. fluvialata* and *lapidata* fetch very little more than a shilling each. *D. sicula* goes up to £1 for three, and *D. bicusps* £1 4s. per pair; but poor *crenata* has very shaky *bona fides* and gets down to 5s. for a specimen, probably about ten times the first cost. Under the

circumstances 24s., 45s., 19s., 32s. 6d., 50s. for single specimens of *bicolor*, and 24s., 30s., 12s. and 14s. for *tritophus* were prices as high as could be expected, the 12 shilling *tritophus* being the Gravesend specimen. The *musculosa* fetched some marvellous prices considering all things, forty shillings as a rule for a pair of these and a pair of *vitellina*. Fourteen *musculosa* in one collection in Britain! I've hardly got over it yet. But if *musculosa*, 40s., what price *l-album*? Eight shillings, including 38 specimens of *L. straminea*, *T. elymi*, &c. Oh! ye buyers, why this thusness? Why is *l-album* thus shady and not *musculosa*? *L. exigua*, £1 15s. for a pair, but poor *P. leucophæa* is under the cloud of *l-album* and eight shillings buys three. Now comes a fresh lot of *C. dispar*: males go again at £4 15s., £5, £5 5s., £5, £4 10s., and £5 5s. apiece; females at £5 10s., and £5; a total of £56 for 13 specimens. Then £2 15s. for a *guenéei*, £3 for another, £1 15s. for a *dumerili*, and 10s. for a pair of *palustris*. *A. cinerea* fails to fetch 1s. apiece, whilst eight *A. agathina*, seven *obelisca*, eight var. *aquilina* with 30 other specimens go at a little above 1d. each. The price of *N. subrosea* (good, honest old *subrosea*) still goes up—£6 6s., £5 5s., £4 10s., £3 5s., £2 5s. and £2 were given for pairs according to condition, whilst excellent *sobrina* and *neglecta* found purchasers at about 2d. each. *Erythrocephala* varied from £1 to 8s. per pair, whilst *D. barrettii*, in good condition, fetched about 7s. 6d. each, and *P. nigrocincta*, 4s. Another test of veracity appears on the scene, and *satura* and *peregrina* with about 30 other specimens go for 6s. a lot. Very good price too for British *peregrina*. Poor *peregrina*! evidently the wanderer finds no rest for the sole of his foot in our island even when "received alive" is added to it. *X. conformis*, £1 for four, and *X. zinckenii* £1 10s. and £1 12s. 6d. for two specimens are eclipsed by *C. artemisia*, which evaded Mr. Burney's eagle eye and was marked "very rare, the specimen was found in a series of *absinthii* and had been overlooked by Mr. Burney." Delightful overlook—£2! *C. gnaphalii*, a pound a pair, and £1 10s. for an *Acontia solaris*. *Plusia bractea* keeps up its price well, but what's wrong? Poor *lunaris*, joins *purpuraria*, *peregrina*, &c. Eight shillings buys a British *lunaris* and a series of *cracæ* and *pastinum*; but, *mirabile dictu!* *alchymista*, £2 5s. and £2 for single specimens amaze one. The *frazini* vary from £1 12s. 6d. to £1 a pair, the latter from Messrs. Hodgkinson and Parry. *Salicalis*, a big lot of insects with five of these for half-a-sovereign, and another big lot of moths with *emortualis*, 6s.; *ramburialis*, 10s. per pair, but the rare *lupulinalis* with 72 other moths fetches only 7s. Poor *lupulinalis*! Poorer *ostrina*! Poorest *paula*! To go in 5s. lots, why even *catalaunalis* reaches eight shilling lots. Well! why is it? The same collectors got some of these that got some of the high-priced Sphinges and butterflies. But here are some good honest-looking *repandalis*, "bred from *Verbascum* at Torquay," £1 1s. to £1 6s. each these are worth. Are they? I'm surely dreaming. My companion nudges me. The sale is over. I start suddenly but I still dream. I'm a poor man, but as I walk out of the sale room I offer up an earnest prayer, "Lead us not into temptation," and as it passes my lips my companion whispers, "And half these buyers are lawyers." [The sale here referred to occupied two days. Probably the bewildered state of mind which our correspondent got into on the first day, led him to forget the fact that there was a break.—ED.].

CURRENT NOTES.

It is with the greatest regret that we hear that our respected contemporary *The British Naturalist*, ceases with the present number. It is much to be regretted that some self-denying naturalist cannot see his way clear to help the Editor in its continuance, especially if it were to revert to its old paths as a magazine of "general" natural history.

Mr. Ralph C. Bradley describes (*E.M.M.*) the following Diptera as new to Britain, viz.:—*Dactylolabis gracilipes*, Lw.; *Goniomyia jecunda*, Lw.; *Ephelia varinervis*, Zett.; *Clinocera lamellata*, Lw., *Didea fasciata*, Macq.

The number of an entire batch of ova of *Zeuzera pyrina*, is reported as between 1,000 and 1,100 (*Insect Life*, vi., p. 40). Dr. G. A. Hankins of Toano, Virginia, reports that "On July 17th, the larvæ of *Leucania unipuncta* were in his millet by thousands;" whilst Professor T. D. A. Cockerell, on Aug. 9th, reported the larvæ of the same species near Las Cruces "in millions," *l.c.*, p. 41.

A paper on "Parthenogenesis among Spiders," by N. Damin, Verh. d. k. k. zool.-bot. Gesell., in Wien, 1893, Band xliii.; II. Quartal., pp. 204-6, is worthy of attention.

An interesting paper on "The androc(h)onia of Lepidoptera," with plates, by Mr. M. B. Thomas, is published in *The American Naturalist*, pp. 1018-1020. A paper on "Animal Intelligence," by Dr. J. Weir, is to be found in the same number (Nov.), pp. 933-943.

Another of Dr. Scudder's works (a companion to that reviewed *ante*, p. 260) has come to hand. This is called *The Life of a Butterfly*, and is thoroughly interesting. The insect known as *Anosia plexippus* or *Danaïs archippus*, is taken as the text on which a number of elementary chapters on insect life in general are built up. To those who do not know all that they yet wish to learn about butterflies, we would recommend the purchase of this interesting little work from Messrs. Henry Holt and Co., New York, U.S.A.

We would direct the attention of our readers to the fact that the price of *Random Recollections of Woodland, Fen and Hill*, has been reduced to Three Shillings, in order to bring the book within the range of every entomologist and general naturalist.

NOTES ON COLLECTING, Etc.

Retrospect of a Lepidopterist for 1893.

The year of grace 1893 will be handed down as an *annus mirabilis* by meteorologists rather than by lepidopterists, but to the latter the glorious weather which has been experienced has been especially welcome. We have no huge migrating hordes to record, but a general abundance of many insects which have been specially well suited by the high temperature and fine weather. From about February 22nd to Nov. 16th we have to write of an almost continual summer with only an occasional break for a few days, whilst for long spells in May and June, and again in July and August, the days were so brilliant, the sunshine so unbroken, and the rain so entirely absent, that many

began to wonder whether it would ever rain again. But these long and continued spells of drought accompanied by heat showed their effect on vegetation, and the hard condition of the ground undoubtedly injuriously affected many insects which pupate under the surface. In the early spring, lepidoptera of almost all kinds were abundant, and the early dates of appearance of many species will undoubtedly be records in this direction. This was especially marked among the butterflies, the large *Argynnis* appearing in early May instead of July and August, *Limenitis sibylla* and other conspicuous species being noticeable almost two months earlier than usual. The autumn *Vanessæ* all appeared in June and early July, a second brood of most of them occurring about the usual time of the first brood, the later brood hanging on in some species even into November. Perhaps the most remarkable point in connection with this genus was the excessive local abundance of *V. polychloros*. The partial second brood of *Leucophasia sinapis*, which occasionally occurs in August, was replaced by a very complete second brood in June, whilst *Papilio machaon* equally early had a very complete second brood in June and July and another partial (third) one in early September. Although very early, the members of the genus *Thecla* were by no means especially abundant, but the appearance of *Chrysophanus phleas* in great numbers this autumn, specimens having been found in the crowded streets in various parts of London, has been quite a feature of the season. Among the rarities, a couple of odd specimens of *Pieris daphidice* are recorded. Mr. Buckler proved conclusively the inability of this species to stand our climate, and there is no doubt that the few specimens taken in July and August on our south-east coast are simply the progeny of an occasional migrant in the early part of the year. Only one specimen of *Vanessa antiopa* is recorded. The occurrence of these odd specimens is inexplicable. That *Lycæna arion* appears to be hunted to extermination point in the only haunts left to it in these Islands is very regrettable. Why don't those people who hunt butterflies to the verge of extinction go to the Alps or some other warmer region where butterflies are in such abundance that there is no chance of their extermination? Perhaps it would hardly be the thing to overlook the special abundance of the larvæ of *Apatura iris* in the New Forest and the appearance of the imagos very early in July this year. Scientifically the most interesting captures perhaps are certain varieties of *Argynnis paphia*. In my early days I remember some of our highly-informed lepidopterists jumping on a friend of mine who hinted that forms intermediate between typical *paphia* females and var. *valezina* were sometimes obtained. However, a most remarkable series of such specimens was this year got together by Mr. J. A. Clark. It is well known that certain specimens of *paphia*, chiefly males, have a pale spot in the centre of each wing, although the cause has never been satisfactorily explained. The females more rarely have it. This year Mr. Clark has a number of specimens in which these pale spots are very conspicuous, but the most interesting point in connection with these is that some of the specimens have a large area round these spots distinctly of the *valezina* colour, shading off into the normal coloration round the outer margin of the wing. Still more strange is the fact that this is not entirely confined to the female specimens, *valezina* being distinctly a female aberration. As is usual in years when this species is so abundant, gynandrous specimens have been captured. The

Coliadæ of last year appear to have wintered successfully in a few instances. Last winter gave the species every chance of doing so both by its excessive mildness and unprecedented shortness. The consequence is, that sheltered spots of our south and south-east coast produced a few autumnal specimens this year, but neither species occurred in the abundance of the previous season. In the Isle of Wight Mr. Moberly came across a small brood of *Melitæa cinxia* which, like *Lycæna arion*, is excessively local and restricted to such small areas that a few ignorant collectors have almost exterminated it as a British species, the cabinets of almost all collectors who have commenced entomology during the last ten years having had the gap filled up with this species from the yet numerous colonies to be found in the Channel Islands. *Pyrameis cardui*, in spite of its abundance in 1892 and the exceptionally mild winter of 1892-93, has been almost entirely absent during this fine summer, but *Erebia epiphron* was found abundantly both in its English and Scotch haunts. I often wonder why we have no Irish lepidopterist with ardour enough to turn this species up again. A specimen of *Polyommatus beticus* is recorded, whilst *Cycloptides palcemon* appears to have been fairly abundant in Lincolnshire.

Turning to the *Heterocera*, very few of the rarer *Sphingidæ* have been captured. *Acherontia atropos* was not uncommon in the larval stage in the Midlands. *Sphinx convolvuli* has been rare, and with the exception of half a dozen *S. pinastri* the other rare species have been almost a blank. It came to my knowledge that Continental pupæ and imagines of two of our rarest Sphinges had been bought in large quantities, whilst at the same time queries from various parts of the country relating to offers of exchange of these species as British also came to hand. This necessitated the attention of collectors being called to the matter. *Macroglossa bombyliiformis* occurred in more than its usual abundance in the neighbourhood of the New Forest very early in the year, whilst the professional collectors in Scotland have between them bred and captured several dozens of *Sesia scoliiformis*, another proof that unless we are on the geographical limits of species, the rarity of most of them is apparent rather than real. *Zygæna pilosellæ* and *Z. exulans* have also ceased to be the rarities they once were, although the long series required now-a-days by many collectors makes them valuable in exchange. The Warrington collectors have again taken specimens of the interesting form of *L. complana* known as *sericea*. *Callimorpha hera* has been bred this year, and also caught at large in its favoured haunts in Devon. Perhaps the most important event of the year has been the domestication of *S. lubricipeda* var. *zatima*. This has been for some years on the British list on the strength of an old figure of Stephens, and some years ago at the sale of a well-known British collection, a long series was disposed of which were generally supposed to have come from Heligoland. A short time ago, Mr. Harrison of Barnsley bred specimens of *lubricipeda* from pupæ received partly from Hornsey and partly from Grimsby. From a pupa supposed to have been sent with the former lot he bred a specimen of *zatima*, and crossing this with a Grimsby specimen, obtained many examples both of the extreme form as well as intermediates. Mr. Harrison at once very generously distributed imagines and placed eggs at the disposal of many of our leading lepidopterists. It appears almost impossible, however, that Mr. Harrison bred his specimen of *zatima* from the Hornsey

pupæ. There is no tendency in the district to vary in any way, and Mr. Riches (the reputed captor) brought to me a large number of specimens (a most normal lot), to see if there was anything among them like *zatima*. Again *zatima* is rather a local race than a chance aberration and, except for domesticated specimens, is very rare on the Continent. I can only suppose that Mr. Harrison's pupæ got inadvertently mixed, and that the specimen was bred from a Grimsby pupa. Assuming the latter to be the case there are two suppositions open as to the origin of the specimen from which long series have now been supplied to our cabinets, viz.:—(1) The production of the specimen on the spot from a regular native or migrating parent, or (2) The production of the specimen from an "escape." With regard to its having been developed from a "regular native" we have to bear in mind, that on the Continent this is never a chance aberration but a local race occurring somewhat rarely, but not usually with the ordinary form in the few localities in which it occurs at all. With regard to its being a migrant we have the evidence of the powerful flight of the species, and the frequency with which it is attracted by light, as well as the immense size of the first brood which Mr. Harrison produced, the specimens being almost double the ordinary size; whilst with regard to its being the progeny of an "escape" I have the evidence of having seen in a London lepidopterist's collection, a series of this extreme form which had been bought and which came originally from a Yorkshire collector, having been bred there the year that Mr. Harrison's specimen was bred. I do not know that these were sent out as British, but the fact remains that some numbers of this particular variety had been and were being bred in the country at the time that this specimen was bred. It has lent itself, as on the Continent, most readily to domestication, and some of our collectors seem likely to emulate Monsieur Deschange, who has we believe supplied most of the Continental collections and dealers from his tame stock. *Hepialus humuli* var. *hethlandica* was again taken in some abundance in Shetland, whilst *Bombyx trifolii* is recorded not only from the Lancashire coast but also from the New Forest. A few *Drepana harpagula* appear to have been bred, whilst *Dicranura bicuspis* appears to have again been taken somewhat sparingly. One species previously only reputed as British has obtained another entry. The record is made in a somewhat off-hand way, by introducing the capture of two specimens of *Naclia ancilla* in Galway without date or captor's name, in Mr. Kane's "List of Irish lepidoptera" now appearing in *The Entomologist*. A species which has such slender grounds for being considered British, should certainly have a great deal more said about its reputed capture. Among the NOCTUÆ a few startling things have occurred. A hybrid race between *Cymatophora* or and *C. ocularis* is perhaps the most remarkable. *Leucania vitellina* in the New Forest and at Freshwater, as also *L. albipuncta* in the Isle of Wight are recorded. *Tapinostola concolor* appears regularly enough now, whilst *Nonagria sparganii* although not recorded in the magazines appears to be getting pretty generally into all London cabinets. Of *Puchetra leucophaea* and *Cerastis erythrocephala*, I said my say in the last No. of *The Ent. Record*, etc. Of *Caradrina superstes* a solitary British record this year is made by Mr. Prout at Sandown (Isle of Wight), although Mr. Hodges records it as abundant in the Channel Islands. The next important item is the breeding of a large number of *Dasycampa rubiginea* by Dr. Riding, and the abundance of *Xanthia gilvago* about

Reading. *Tethea retusa* and *Calymnia pyralina* appear rarer than ever, whilst *Polia xanthomista*, *Dianthæcia luteago* var. *barretti* and *D. cæsia*, appear to be obtained regularly by the Isle of Man and Howth workers. *Crymodes exulis*, as usual fell to the Shetland workers, whilst the Scotch *Anartias*, favoured by the fine weather, were more than usually abundant. Mention must also be made of the breeding of a large number of *Plusia moneta* from pupæ obtained in Kent. One of the most remarkable records during the year was the capture of a specimen of *Catocala electa* during the previous autumn at Corfe Castle.

The GEOMETRÆ were, in the spring and early summer, excessively abundant, and we cannot do more than mention the chief things. An abundance of *Boarmia roboraria* in the New Forest, the breeding of a large number of *B. repandata* var. *conversaria* and of *Phorodesma smaragdaria* may be mentioned, so also may the capture of the Highland species, *Psodos trepidaria*, *Fidonia carbonaria*, *Halias brunneata*, *Larentia flavicinctata*, *Emmelesia ericetata*, *E. adæquata*, *Eupithecia helveticaria* with its var. *arceuthata*, and *Phibalapteryx lapidata*, some in very considerable abundance. The best thing of the year in this family, however, has been a fine series of *Acidalia humiliata* which Mr. Hodges captured in the Isle of Wight. Rumours of the *circellata* form of *A. straminata* occurring again are softly whispered, whilst still more faint is the breath that tells us that *Cidaria reticulata* has occurred not uncommonly in its old haunts. A magnificent series of *Melanthia rubiginata* var. *plumbata* were taken in the Western Highlands, but of *Campptogramma fluviata* there is not a record again this year. Of the DELTÖIDES there is no rarity to record, whilst among the PYRALIDES the capture of several *Scopula decrepitalis* on the shores of Loch Long, a more than ordinary abundance of *Spilodes cinctalis* in Kent, and the capture of *Ebulea stachydalis* in the same county are worthy of record. Among the CRAMBI the energy of the professionals in Scotland has brought *Crambus ericellus*, *C. furcatellus* and *C. myellus* into decided prominence. I have heard of nothing special among the PHYCITIDÆ except the capture of rather more specimens than usual of *Epischia banksiella*, nor among the Pterophorina. Of the TORTRICES, *Tortrix piceana* has not been uncommon, and most of our local Scotch species have occurred somewhat abundantly. The capture of both *Steganoptycha subsequana* and *S. pygmæuna* at King's Lynn reflects great credit on a good lepidopterist, whilst the rare *Retinias* can hardly be called rare any longer. *Halonota ravulana* was recorded from Folkestone and King's Lynn. We have heard nothing of the rare *Stigmonotas* recently, *dorsana*, *leguminana*, *pallifrontana*, &c. but Mr. Thurnall has unearthed *Dichrorhampha alpestrana*, a species likely to prove not uncommon in our southern counties, and Mr. W. H. B. Fletcher found *Grapholitha gemmiferana* in Hampshire. Among the PSYCHIDÆ, the regular capture of *Psyche reticella* by Mr. Whittle now seems assured. *Tinea simpliciella* has been reported as occurring not at all rarely in Kent, whilst Mr. Richardson distinguishes *Blabophanes heringi* from *B. ferruginella*. A species of *Depressaria* which I named provisionally *aurantiella*, was at once detected in his collection by Mr. J. Jenner Weir. Mr. Nelson Richardson has described a new *Gelechia* under the name of *Lita suædella*, whilst Mr. Barrett adds another to the British list, in *Bryotropha figulilella*, and Dr. Corbett a new *Lithocolletis* under the name of *cerasicolella*, but very little else of importance appears to have been recorded.

Short papers of scientific interest to lepidopterists are about as numerous as usual. The first place, scientifically, must be given to Dr. Chapman for his paper on "The pupæ of *Heterocerous Lepidoptera*" (*Trans. Ent. Soc. Lond.*); "Notes on *Stauropus fagi*" (*Ent. Record*) by Mr. Bayne; "The Genus *Xanthia*" (*Ent. Record*); "The Variation of *Papilio machaon*" (*Ent. Record*) by Mr. Farren; "Experiments in hybridising Burnet moths" (*E.M.M.*) by Mr. W. H. B. Fletcher; "Specific Nomenclature" (*Ent. Record*) by Dr. Buckell; "On a Lepidopterous pupa with functionary active mandibles" (*Trans. Ent. Soc. Lond.*) by Dr. Chapman; "Catalogue of the Lepidoptera of Ireland" (*Entom.*) by Mr. W. F. de V. Kane; "On the earlier stages of the Nepticulæ" (*E.M.M.*) by Dr. Wood; "The History of Butterfly Classification" (*Ent. Rec.*) by Dr. Buckell; "Variation in *Vanessa atalanta* and *V. cardui*" (*Entom.*) by Mr. South, whilst the same author's "*Spilosoma lubricipeda* var. *zatima*" was entirely marred and rendered abortive by the supposition that the variety of this species called by the Yorkshire lepidopterists, *radiata*, was in reality the extreme form; "The effects of temperature in the pupal stage on the colouring of *Pieris napi*, *Vanessa atalanta*, *Chrysophanus phleas* and *Ephyra punctaria*" (*Trans. Ent. Soc. Lond.*) by Mr. F. Merrifield; "On the phylogenetic significance of the variations produced by differences of temperature in *Vanessa atalanta*" (*Trans. Ent. Soc. London*) by Dr. Dixey. Dr. Chapman's paper "On the Larva of *Arctia caia*" (*Ent. Record*) is now in course of publication.

Some very remarkable contributions to science (?) have appeared during the course of the year, of which probably the 'decoy' article in *The Entomologist*, and 'Notes on the Synonymy of British butterflies' in *The British Naturalist*, are the most noteworthy. It is also perhaps time to consider how far certain papers are suitable for Magazines, on account of their length and the period of time over which they are necessarily spread. As examples, I may instance my own "Monograph of the British Pterophorina" in *The British Naturalist*, which has been some years in process of publication, and of which the first part will be some four or five years behind date by the time the last part is finished. Mr. W. F. de V. Kane's "Catalogue of the Lepidoptera of Ireland," now in process of publication in *The Entomologist*, and which cannot be finished for some years without ousting other equally important matter appears to be in a very similar position. Such papers as these are not altogether unsuitable for Magazine publications if space could be spared to bring them out in a reasonable time, but as it cannot under existing conditions, it is evident that they should be brought out in separate publications. It is generally supposed that lepidopterists will not support the production of separate publications, and there is perhaps rather too much truth in the matter, although personally my experience is exactly to the contrary, as evidenced by the generosity of the entomological public in helping me to bring out my *Varieties of the British Noctuxæ*. At any rate, I feel satisfied that authors of separate papers, such as local lists of importance with scientific details, monographs of large genera, &c. would do better to appeal to the entomological public and leave to the magazines more perishable matter, unless indeed their papers will not be lessened in value by slow production, and will be published separately afterwards.

Of individual efforts the first volume of Mr. C. G. Barrett's *British*

Lepidoptera has been completed, so also has the fourth and last volume of *The British Noctua and their Varieties*. I have been repeatedly asked—Why not bring out an up-to-date volume dealing with the physiological and philosophical sides of entomology in a popular form, and, as far as possible, in untechnical language? After consideration, I set to work and wrote a series of articles in what I trust may be considered a popular and readable form, introducing the various physiological processes connected with lepidoptera in all their stages, and also the main philosophical questions bearing on lepidoptera now before the entomological public. This is now being published as *Random Recollections of Woodland, Fen and Hill*, and this meagre list appears to total the actual appeals made for the support of British lepidopterists. A miserable show compared with the sister sciences.

Probably the Societies have been rather less active during the current year than usual. The Entomological Society of London æstivated this year, and its meetings are now held on such a variety of days, that without a member's card in front of one, it is impossible to remember when the meeting is to be held. Its *Transactions*, however, are up to the mark as usual. They contain so much matter too, relating to British lepidoptera, that no one with any pretence of being considered a scientific entomologist can possibly do without them. The City of London Entomological Society under Mr. J. A. Clark, has had a very successful year, a number of most important scientific papers having been read at the meetings. Its modest *Transactions* contain a summary of its work, and the various papers read are printed *in extenso*. The South London Ent. Society has had a most placid and peaceful year, the meetings have been exceedingly quiet, and papers (with the exception of notes read with exhibits), conspicuous by their absence. It has however produced the *Proceedings* for 1890-'91, a very readable volume. Of the provincial Societies, the Lancashire and Cheshire Ent. Society and the Birmingham lead the way, whilst those of Cambridge, York, Penarth, Leicester and Nottingham, occasionally let us know of their existence, but I have not noticed the publication of any important contributions to entomological science which have been read before them, except the paper by Mr. Farren previously noted.

Of the magazines the *E.M.M.* still receives most of the notes and articles relating to Diptera, Hemiptera and Hymenoptera; *The Entomologist* appears to have improved considerably, and to have let the fauna of China and Japan go considerably by the board. *The British Naturalist* has been noted this year for Dr. Buckell's strictures on Mr. Dale's synonymy papers. Whether such papers as those of Mr. Dale make up for those healthy-toned botanical papers by Mr. Soutter, redolent of country lanes and woods, is hardly a matter for our consideration. "Spiders" and "Sphinges" still come slowly on, the information relating to the latter in many instances, appears only to be brought up to about 1870, the author not being up to date in magazine and other literature. *The Naturalist*, *The Annals of Scottish Natural History* and *The Irish Naturalist* provide us with an occasional important entomological article.

If the scientific lepidopterist has not startled the world in 1893, at any rate, the observer and collector alike will look back with pleasure on a year, the meteorological conditions of which, rarely fall more than once in the life-time of any individual.—J. W. TUTT. *December 1st, 1893.*

AUTUMNAL COLLECTING AT FRESHWATER.—As indicated in my last brief notes from the Isle of Wight (*ante*, p. 253), I was compelled by circumstances over which I had no control, to leave the lepidoptera of my favourite resort in peace, so far as my own efforts went, during the whole of August and the first week of September. Possibly this may have been a blessing in disguise, as, during the leisure at my disposal whilst away from it, I was enabled to secure in Guernsey a long series of the *Caradrina* which occurs occasionally at sugar on the cliffs of our southern coasts, *viz.*, *C. superstes*, by means of which series, since distributed in twos and threes amongst our active collectors, I trust that ere long this species hitherto passed over may be proved to occur elsewhere than on Freshwater and Culver cliffs, where my own two and Mr. L. B. Prout's one, British specimens, have respectively been captured. During the first part of August, Freshwater certainly did not suffer by my absence, as Mr. Geo. O. Day spent some little time there, and those who know the energy of this gentleman, especially when added to it, must be counted the seductive attractions of "Day's Elixir," will feel that my absence was fully avenged. Unfortunately, August is not altogether the best month of the year there, although Mr. Day was fortunate in securing a magnificent dark (almost black) form of a second brood of *Hadena dentina*, and whilst friends of my own continued working with a perseverance really admirable and worthy of ample reward, yet, with the exception of a few very fine *Agrotis obelisca*, the "bag" of the month was more remarkable for quantity than for quality. I was induced to somewhat hasten my own return to the scene of action by an old-standing promise to meet my friend Mr. F. J. Hanbury there so soon as the usual autumnal "good things" were well "underweigh;" but an important business engagement unavoidably detained me, so I had to test the merits of amateur maps and sketches, to indicate the spots to repay work, against those of a "personally conducted" order. Here I must acknowledge the courtesy of Mr. Hanbury in return, in keeping me well posted up in the lists of captures, and when as a "capper" on the same I learnt of the important capture of *Leucania vitellina* at Brockenhurst in the last week of August, I felt it to be now or never, and making all arrangements by wire, I returned at once, knowing that Freshwater could never be behind, when rarities of the calibre of *vitellina* were to be taken in so hackneyed a ground as the New Forest. My confidence in my old spot was fully justified, although by the irony of fate, wind and tide so delayed the "fast and powerful" mail steamer, that the down train at Southampton which I had hoped to catch, left before our arrival, and I had the pleasure of waiting two hours with visions of *vitellina* floating before me. It was a perfect night for collecting, warm and dry, conditions evidently suited to psychological communication, for upon my ultimate arrival too late for action, the prompt reply to my eager question as to what the capture of the evening had been was "*Vitellina*, of course!" Such is fate, but even fate is powerless before the kind courtesy of the fortunate captor, Mr. Hanbury, who, upon the capture of a second specimen a few days later within the same locality, whilst exchanging "grounds" with myself for the evening, upon a system of mutual assistance which can be recommended to all entomological friends, very generously allowed the specimen to pass into my own possession, where it now saves from utter loneliness the specimen captured by myself a few years previously.

The evening of my return proved also very productive in other species, *Apoorphylla australis* and *Agrotis obelisca* shewing up well—the latter being as usual worn to the extent of about 90 per cent., the former good. A new and prolific spot for the former species was discovered by the enterprise and energies of Mr. Hanbury's sons, and upon another suitable evening I boxed some fifty to sixty fine specimens within less than as many minutes upon a sugared fence, between 11 p.m. and midnight; this species is, I believe, as a rule late in its visits to the treacle. We were joined and reinforced just before this period by Mr. A. W. Mera, and during our united stay Freshwater certainly was worked at night as it never had been before. Owing to the very limited quantity of ground available for remunerative work the greatest personal consideration was necessary, and the concord that should mark all entomologists in field work and which is more to the front in the field than in the study was amply in evidence. Unfortunately, there was a complete absence of *Laphygma exigua* and other good things, but an abundance of all that could be reasonably expected. *Epunda luteolata* and *Calocampa exoleta* only occurred once, whilst *Ancho-celis lunosa* and the usual rank and file of autumnal captures were plentiful. The virtues of some of the older preparations for treacling were tested, as Mr. Hanbury has, like Mr. Day, devoted some amount of time and expense to discovering the best paying mixture, but as he supplied all our "tins" during our joint stay the Noctua were spared the invidious duty of deciding the point. *Agrotis saucia* was quite easy to obtain, but in nothing like the profusion of the preceding autumn. Many very fine forms of *A. segetum* were obtainable, whilst the usual very late laggards of *Gnophos obscurata* visited sugared flower-heads on the cliffs; being large, pale and somewhat worn, they arouse constant suspicions as to their identity, which are, however, I consider, groundless. Whatever the results of the September work, no accusation of want of energy can be laid at our doors; although the evenings were long and it was necessary to start by 6 p.m., it was rarely before midnight that the last captures were made and the different parties would meet to compare notes on the results of the evening's work, which were mostly sufficiently satisfactory to send the satiated captors in a comfortable frame of mind to their well and hardly-earned repose.—ALBERT J. HODGES.—November, 1893.

NOTES OF THE SEASON.

Sutton Park, near Birmingham.—The season opened well with *Lycaena argiolus* and *Thecla rubi* on the wing at the beginning of April in greater profusion than usual. *Lobophora viretata* was, I hear, plentiful, though I did not find it so; however, I took a variety of this insect (the only one I have ever seen), in which the median band was entirely absent, so that both fore wings are of a uniform green. *Hadena glauca* seemed a little less scarce than usual, though perhaps it was because I devoted more time to searching for it on tree trunks and palings; this appears to be the only way of obtaining the perfect insect in this locality. Mr. Horne tells me that he took one specimen at sugar in Orkney, but I have tried here for the last two years without success. According to Mr. Mutch the Scotch form of *H. glauca* is decidedly darker than that from the Midlands. I was fortunate enough to obtain ova, and although I have always understood that the larvæ of the genus *Hadena* are difficult

to rear, this species must certainly rank as an exception, for I found it quite the easiest of any larvæ I have tried; sleeved on sallow they fed up rapidly and pupated with only one exception. The larva, in its earliest stage of existence, is of a glaucous colour, changing with every skin first to a darker tint of sap-green, then to a rich velvety bistre brown indeed almost black, until finally it is in its last skin of pale umber brown with markings of a darker shade; it is an irritable larva and lashes out if annoyed or shaken from its food plant. Towards the middle of August, *Nonagria arundinis* (*typhæ*) and *Tapinostola fulva* put in an appearance, though neither in any numbers. Quite the commonest insect in Sutton Park this year was *Noctua dahlii*; it absolutely swarmed at heather bloom, which also attracted *Noctua glareosa* in goodly numbers; the latter, I am told by a correspondent, are of a very pale form. Early in September sugar began to be regularly attended by *Xanthia silago* and *cerago*, and among the latter occurred two good specimens of the var. *flavescens*, one of an orange tone and the other the very pale yellow form. On the 4th of September I took a pair of *Agrotis obelisca* at sugar; this is, I think, quite a new locality for the species. The following evening produced a single specimen of *Xanthia gilvago*, also a fresh record for the immediate neighbourhood. *Agrotis saucia* was an occasional visitor, and of the commoner insects *Anchocelis litura* was the most abundant. *Macroglossa stellatarum* has been fairly plentiful here, though not easily caught, but a friend at Bromsgrove, throughout September, took as many as three and four each evening at light! On the whole I think the season has been a good one, and I am especially pleased at having turned up one or two things (new to this district) in Sutton Park, which I had considered worked out.—P. W. ABBOTT, Four Oaks, near Birmingham. November, 1893.

Berkshire and Oxfordshire.—Part of April and May, the whole of August, and the greater part of September, I collected in Berkshire in the neighbourhood of Newbury, the rest of the season being spent in Oxfordshire. Sallows were well in blossom by the middle of March, but though the commoner species came well, I took nothing worthy of note. In April, among many others, I took good series of *Panolis piniperda* including a beautiful var. *grisea*, *Hemerophila abruptaria*, *Tephrosia crepuscularia*, *Syrichthus malvæ*, *Nisoniades tages*, and larvæ of *Ellopiæ prosapiaria* (*fasciaria*). During the first week of May *Nemeophila plantaginis* was flying in countless thousands and from ova obtained then I have reared a second brood. *Thecla rubi* was just coming out. On the 7th the first of a number of *Sphinx ligustri* came to honeysuckle; while *Emmelesia albulata* was well out by the 11th. I bred nice series of *Dianthæcia carpophaga* and *Eupithecia venosata* from seeds of *Silene* collected last year. Many insects came well to light. On the night of the 15th I took between 50 and 60 in my trap, including some beautiful specimens of *Neuria reticulata* (*saponaria*). Among many others sent from Berks, were *Sphinx ligustri*, *Notodonta trepida*, *Agrotis cinerea* (1), *Grammesia trigrammica* (*trilinea*), *Hadena genistæ*, *H. pisi*, *H. thalassina*, *Eurymene dolobraria*, *Selenia lunaria* and *Numeria pulveraria*. The first of a good series of *Aplecta advena* came to light on May 22nd. Sugar was a total failure. June produced *Anticlea rubidata*, *Melanippe rivata*, *M. procellata*, *Scotosia vetulata* and *Acidalia imitaria* among others, by beating; while *Nudaria mundana* was very

common at light. Honey-dewed currant bushes attracted numbers of insects, but sugar was no good. The best taken during July were *Iodis vernaria* and *Macroglossa stellatarum*. Very few came to sugar, and not as many as usual to light. With August came a change as regards sugar, many insects being attracted in good numbers. Among others, *Noctua rhomboidea* (30), *N. umbrosa*, *N. baia*, *N. depuncta* (5), *Triphæna fimbria*, *Amphipyra pyramidea*, *Cosmia affinis*, *C. diffinis* (two quite fresh specimens on the 15th), *Xanthia citrargo* and *Asphalia diluta*. *Hydræcia micacea* and *H. nictitans* preferred sunflowers to sugar. Light produced a few *Luperina cespitis*, but the moon interfered just as they began to come plentifully. *Neuronia popularis* was particularly plentiful at light in September. I netted two ♀s this year for the first time (nothing but males came to the trap). *Macroglossa stellatarum* was abundant throughout the month. Early in October I had a fair specimen of *Xanthia aurago* sent from Berks, whilst I took one here at ivy. I noticed second broods of *Leucania pallens*, *Mamestra brassica*, and *Agrotis exclamationis* at sugar.—J. H. D. BEALES, Kiddington, Woodstock. November, 1893.

Southend.—The following species were taken or bred during the past season in the Southend district:—*Hybernia leucophæaria* occurred at Eastwood in February; in March, *Tortricodes hyemana*, *Anisopteryx æscularia*, *Diurnea fagella*. The only visitors observed at the Southend shallows were *Tæniocampa gracilis*, *stabilis* and *gothica*. In April a single *Tæniocampa miniosa* ♂, a full-fed larva of *Triphæna fimbria*, and specimens of *Incurvaria muscalella*, *Micropteryx subpurpurella*, *unimaculella*, *Lithocolletis cramerella*, *quercifoliella*, *Heliozele sericiella* were found at Eastwood; while nearer Southend, *Eupithecia pumilata* and a large number of larvæ of *Nænia typica* were taken. During May *Polyommatus phleas*, *Argynnis euphrosyne*, *Ennychia octomaculata*, *Viminia rumicis*, *Phoxopteryx lundana*, *Lobesia reliquana*, *Gracilaria alchimiella*, *Coccyx splendidulana*, *Teleia proximella*, *Capua favillaceana*, *Phæodes tetragnetra*, *Acidalia remutaria*, *Asthena candidata*, *Euchlœe cardamines*, *Venilia macularia*, *Iodis lactearia*, *Pechypogon barbalis*, *Penthina pruniana*, *Grapholitha subocellana*, *Harpella geoffrella*, *Dasycera olivierella*, *Tortrix ministrana*, *Elachista rufocinerea*, *Chrysoclysta aurifrontella*, *Lithocolletis sylvella*, *Argynnis selene*, *Heliaca tenebrata*, *Ephippiphora brunnichiana*, *Catoptria ulicetana*, *Glyphipteryx fuscoviridella*, *Melanthia ocellata*, *Crambus pratellus*, *Melanippe montanata*, *Cænonympha pamphilus* were taken at Eastwood, and *Cilix glaucata*, *Rumia luteolata*, *Melanippe fluctuata*, *Pionea forficalis*, *Hepialus lupulinus*, *Blabophanes rusticella*, *Acidalia subsericeata*, *Corenia ferrugata*, *Elachista argentella*, *Laverna epilobiella*, *Ornix anglicella*, *Lita obsoletella*, *Pardia tripunctana*, *Sericoris lacunana*, *Agidistis benettii*, *Ergatis brizella*, *Eupæcilia vectisana*, *Crambus hortuellus*, *Eurrhpara urticata*, *Ephippiphora trigeminana*, *Lycæna icarus*, *Cataclysta lemnata*, *Sericoris littoralis*, *Eupæcilia affinitana*, *Euclidia mi*, and *Epichnopteryx reticella* on or near the marshes. Of *reticella* I was able to secure a number of fine examples and five cases which were attached to a rather wiry grass (*Poa maritima*?) that grows in patches on the open marsh. This grass furnished all, or nearly all, the specimens obtained. Just a few were taken among the *Plantago* and *Atriplex*—the latter so common all over the saltings. Here and there on the marsh I came across a dead plant of *Aster tripolium*, the receptacle of which was strikingly like *reticella* at rest. At Eastwood,

in June, *Cidaria truncata*, *Eucosmia undulata*, *Hydrocampa nymphæata*, *Euchromia purpurana*, *Catoptria hypericana*, *Melanippe hastata*, *Argyresthia mendica* and *albistria*, *Sciaphila chrysanthemana*, *Penthina corticana*, *Scopula olivalis*, *Tortrix viridana*, *Spilodes verticalis*, *Zanclognatha grisealis*, *Asthena luteata* and *Adela degeerella* occurred, while on the marshes as early as the 2nd of the month, a few almost full-grown larvæ of *B. castrensis* were found, and young broods were common. In this neighbourhood *castrensis* is still to be found freely every year in its rather restricted haunts. In ordinary seasons it seldom happens that parasites are bred from the larvæ; but there was an exception this year, for many of the larvæ were destroyed by them. Other insects found were *Camptogramma bilineata*, *Eupithecia oblongata* and *subumbrata*, a fine *Spilosoma mendica* ♂, *Bucculatrix maritima* (abundant), *Homœosoma sinuella*, *Leucania pallens*, *Platyptilia gonodactyla*, *Doryphora palustrella* (among *Scirpus maritima*), *Tinea pellionella*, *Spilonota trimaculana*, *Uropteryx sambucaria*, *Xanthosetia humana*, *Sphaleroptera ictericana*, *Scoparia dubitalis*, *Platytes cerusellus*, *Acidalia dimidiata*, *Cidaria fulvata*, *Caradrina morpheus*, *Crambus culmellus*, *Scythropia cratægella*, *Timandra amataria* (worn), *Acidalia incanaria*, *Phtheochroa rugosana*, *Xylophasia lithoxylea*, *Crambus hortuellus*, *Acidalia immutata*, *Macroglossa stellatarum*, cocoons of *Zygæna filipendulæ* everywhere, and larvæ of *Eriogaster lanestris*.

At Eastwood, in July, *Asthena candidata*, *Cerostoma costella*, *radiatella* (abundant and in great variety), *sylvella*, *Harpieteryx xylostella*, *Pædisca corticana*, *Cabera pusaria*, *Rodophæa consociella*, *Hedya ocellana* and *dealbana*, *Pædisca profundana*, *Lycæna astrarche*, *Argynnis adippe*, *Pararge megæra*, *Melanargia galatea*, *Mimæseoptilus plagiodactylus*, the last beaten out of scabious. *Botys fuscalis*, *Acidalia trigeminata*, *Crambus inquinatellus*, *Scopula prunalis*, *Emmelesia alchemillata*, *Tortrix unifasciana*, *Argyresthia nitidella*, *Gonepteryx rhamni*, *Phytometra viridaria*, *Polyommatus phleæas*, *Ennychia octomaculata*, *Agrotis suffusa*, *Orthotænia antiquana* (*Stachys sylvatica* growing near) occurred, while in Southend *Abraxas grossulariata*, *Eupithecia pumilata* and *Phibalocera quercana* were taken; *Coleophora argentula* was bred from seeds of *A. millefolium*; *Catoptria æmulana* var. *tripoliana* from sea-aster, and *candidulana* from the flowers of sea-wormwood; *Eupæcilia roseana* from *Dipsacus*. At Eastwood, in August, *Pæcilia nivea*, *Carpocapsa splendida*, *Vanessa atalanta* and *Asthena candidata* were taken: nearer Southend, *Orgyia antiqua* (at rest), *Aspilates ochrearia*, *Eubolia bipunctaria*, *Bryophila perla*, *Tortrix costana*, *Ægonia quercinaria*, *Noctua xanthographa*, *Miana bicoloria* (a very abundant insect on the marshes), *Catoptria æmulana* var. *tripoliana* and *Crambus selasellus* at dusk; *Calymnia affinis* and *trapezina* and *Pterophorus monodactylus* (very variable) at sugar; *Agrotis segetum*, *Noctua c-nigrum*, *Leucania pallens* and *impura* at ragwort. I was fortunate in finding towards the end of the month a large number of larvæ of *Phorodesma smaragdaria*. In September ragwort yielded *Nomophila noctuella*, *Caradrina quadripunctata* and *Plusia gamma*; sugar, *N. noctuella*, *Phlogophora meticulosa*, *Agrotis puta*, *Xanthia fulvago* (*cerago*), and *golvago* (3 only), *Agrotis segetum* and *suffusa*, *Depressaria arenella*, *Xanthia circellaris*, *Hypena proboscidalis*, *Agrotis saucia*, *Apamea didyma*, *Triphæna comes*, *Anchocelis litura*, *pistacina*, *Triphæna pronuba*, *Anchocelis rufina* and *Orthosia lota*. At light, *N. noctuella* (very abundant everywhere) *Crambus geniculeus*; *Neuronia popularis*, *Hydræcia micacea*, *Acidalia*

marginipunctata and *Eugonia fuscantaria*. To take moths at light I used one of Watkins and Doncaster's lamp nets—a useful addition to the apparatus of any collector who pays attention to the lepidoptera of street lamps. In October, *Chesias spartiata* was taken at rest; *Eubolia cervinata* and *Himera pennaria* at light, and *Scopelosoma satellitia*, *Cerastis vaccinii* and *spadicea*, *Depressaria subpropinquella* and *Oporabia dilutata* at sugar. The only new visitors at sugar in November were *Cheimatobia brumata* and *Calocampa exoleta*.—F. G. WHITTLE, 5, Princes Street, E.C. December 2nd, 1893.

East Devon.—A glance back at the season of 1893 may show a few points worth noting, due to its continuous mild temperature and unusual dryness, which brought us here nearly to a water famine. Many sallows were in full bloom by the first week of March and were almost all over by the end of the month, but the *Tæniocampæ* and other early moths were, for the most part, only out in breeding cages, so our sallow captures were poor and my best insect was a hybernated *Xylina socia*. The May insects I was breeding, such as *Epione advenaria*, *Ephyra porata*, *Cidaria silaceata*, *E. omicronaria*, *Smerinthus tilia*, &c., emerged in March and the beginning of April, and many of the summer and early autumn insects were ante-dated by five or six weeks, so that their freshness was gone when taken on the wing. Eggs, too, hatched early, and the young larvæ of *Dasyampa rubiginea*, *Xanthia aurago*, and others came out in the middle of March instead of waiting till the end of April or May. Searching at night in the lanes and hedges gave us larvæ of the usual common NOCTURÆ, several nice varieties of *N. festiva* being bred later on, and best of all, two fine var. *conversaria* of *Boarmia repandata* from larvæ feeding on hawthorn. During May large numbers of larvæ were beaten out in the day time, especially from the oaks, some of the best being those of *Asphalia ridens*, which occurred in several different places, showing it to be well established here. A few wet days set in at the end of May (the last for a long spell) and scarcely any of the early larvæ were to be taken afterwards. About the middle of March, *Amphidasys strataria* came out in the breeding cages, one being a female; with her I tried "assembling," and before 9 p.m. a number of males were fluttering about the cage suspended from the branch of an oak in an open spot. Within half an hour I had boxed between 20 and 30 fine and somewhat variable males and could have taken many more had I been disposed. Is not this sudden appearance in large numbers of insects otherwise unnoticed very curious? Does it not give us a hint that when we speak of certain species as being rare or even extinct, it is often a mistake, and shows rather that our methods of searching and attraction are at fault? Though on the look out for *strataria* for three years in the usual way, I never found one till my son dug up a few pupæ last autumn, and it is only through his so doing that I am able to say that the insect breeds here abundantly. There is such an amount of foliage and vegetation of all kinds in Devonshire, that it must afford an immense area for the breeding and shelter of insects, and I cannot but think that it is probably owing to this that I and others have thought insects scarce, certainly we very rarely make large bags of anything. Late in April and early in May, *Leucophasia sinapis* was met with abundantly in its morning flight, between 10 and 12 a.m., along many of the hedges, and *Argynnis euphrosync*, *A. selene*, *Thecla rubi*, *Nisoniades*

tages, *Syrictus malvæ*, *Tephrosia biundularia*, *Venilia macularia*, *Selenia lunaria*, *Numeria pulveraria*, *Heliodes tenebrata*, &c., kept turning up in their usual localities, and later on *Ligdia adustata*, *Emmelesia decolorata*, *Coremia designata*, *Cidaria silaceata*, *C. truncata*, *Dasychira pudibunda*, *Grammesia trigrammica* and its var. *bilinea*, *Plusia chrysis*, *P. pulchra*, *Hadena thalassina*, *Leucania comma*, *Mamestra furva*, *Nemeophila russula*, (two being ♀s), *Bombyx rubi*, *Hyphenodes albistrigalis*, *Notodonta trimacula* (bred), *Eurymene dolobraria* (bred) &c. and then the usual autumn insects. Five pairs of eyes could not manage to count up a dozen *Agrotis agathina* between them, after well searching its home for several nights in August, and nearly all of these turned up at the end of the month and had only too evidently seen better days. The form taken here is very handsome, more or less reddish and larger and paler than those Scotch insects I have seen. My son took a ♀, which laid a good supply of eggs, and the young larvæ are still feeding on Scotch heather as well as ling; they look healthy enough as yet (a few have moulted a third time), but there is still many a long week before they can pass the Rubicon, and I shall not feel safe till they have pupated. *Stilbia anomala* was abundant on the heathery slopes of the hills and wanted, as usual, a sharp eye and hand to catch it during its first flight just as it got dark. I found an easier way was to wait till between 9 and 10 p.m. when many could be boxed at rest on the top of the reeds and grasses, tired out. Most of the ♀s were spent, but two laid a few eggs and some larvæ are now feeding on the common *Poa*. Unfortunately I was somewhat late for the insect in the middle of August. It must have been out some little time, though it very soon gets damaged. *Noctua castanea* var. *neglecta* also turned up at heather as usual, but none of the intermediate vars. between it and *castanea*. A few *Luperina cespitis* were taken flying to the lanterns (and in the moth trap a few ♂s), and one netted by a friend obligingly scattered several hundred eggs in the pill box as soon as captured, in which act she had probably been disturbed. The eggs soon changed and have been for many weeks of a leaden colour and silvery hue, the young larvæ evidently only waiting for the first spell of warm weather in early spring to emerge. *Tapinostola fulva* was also taken freely at rest in damp places, on reeds and grasses; all sorts of varieties, occurred from the unicolorous pale bone coloured form to the large brown insects with distinctive lines and dots. A few handsomely marked *Charæas graminis* were also taken in a similar way.

Some sheltered ivy was in bloom at the end of August, and most was fully out in September; but few insects (except bees, wasps and flies, in the day-time) seemed to visit it. Those that turned up were the usual company, *A. macilenta* and vars., *Orthosia lota*, *Orrhodia vaccinii*, *O. ligula*, *Anchocelis pistacina*, *Agrotis segetum*, *Miselia ozyacanthæ*, with a few *A. saucia*, and best of all, two *Xanthia aurago*. One of the latter, fortunately, was a ♀, and laid a small batch of eggs, or rather scattered them, on the stems and leaves of beech. Like those I had last year they soon changed colour, and the young larvæ are now hibernating in their shells. The insects I bred from the larvæ of 1892, kept emerging from August 21st till the end of September, at many days interval; 18 in all. I paired two, but though the ♀s laid a large number of eggs none were fertile. As the insects came out so irregularly, the ♀s were necessarily kept waiting for the ♂s, and it has occurred to me that the

infertility of the eggs may be due to this. I did not see them mate, and as the calling of the ♀ generally takes place on the first night after emergence or rarely on the second, it seems as though it might be a *sine quâ non* to ensure fertility, somewhat analogous to a similar period with animals. The majority of the specimens bred were vars. *virgata* and *rutilago*, and there was only one of the type. Light was less attractive than in 1892, at least in the autumn, probably on account of the constantly clear sky and frequent bright moon, in some or other of its phases. I feel certain there are three essentials at least, for success with light (trap or otherwise). (1) A commanding out-look; the more extensive the better. (2) A powerful light, with no other near to act as a counter-attraction, whether natural or artificial, moon or lamps, and (3) Absence of any cold easterly wind. My trap acted well in the spring, and frequently held 20 to 30 moths in the morning, the best being *Hypsipetes ruberata*, *Selenia lunaria* and *Grammesia trigrammica* var. *bilinea*, but was a comparative failure in the autumn, though it has given me a few *L. cespitis*, *Himera pennaria*, *Diloba cæruleocephala*, and latterly, *Pæcilocampa populi*.

Sugar was a failure, as usual here, but the myriads of Aphides on all sorts of trees and plants left so much honey-dew that, this year at least, it cannot be a matter for surprise. A few *Bisulcia ligustri*, *Calymnia affinis* and worn *C. pyralina* were its best visitors. Apropos of *pyralina*, I missed it in its freshness, as I did many others owing to their unusually early appearance. It must have been out during the two last weeks in June and seems to have a short life. I sleeved three worn females on plum, elm and pear, and fed them, hoping to get eggs, but, as before, had no success. The insects simply battered themselves to pieces in a week or ten days. Why is this? If impregnated, they would surely remain, as others do, more or less quiet, fulfil their life-purpose of laying eggs, and then die. Can it be that they do not pair directly they come out, and that their wild flights in confinement are struggles to escape and seek their mates? I did not find any ♂s near them, but they were sleeved a little way off their haunts. However, the idea seems possible, and I should be disposed to test it, if I have another opportunity, by keeping ♂ and ♀ together.

Another very unusual event, connected with the temperature, has been the rearing of third broods of *Ephyra porata* and *Cidaria silaceata*. The 1st brood of both, emerged early in April; the 2nd, about the middle and end of June; and the 3rd, the middle and end of August. *E. porata* was, in each case, some days later than *C. silaceata*, and only some half-dozen of both the last broods came out, and the remainder are going over till next year.—W. S. RIDING, Buckerell Lodge, near Honiton. November 25th, 1893.

SOCIETIES.

CITY OF LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—Tuesday, November 21st, 1893.—Exhibits:—Dr. Buckell, a series of *Ennomos angularia*, bred from larvæ found on lime trees in Kensington Gardens. The males, with one exception, were of the normal ground colour, but the females were pale, two of them indeed almost white;

one male was a noteworthy variety, its colour was uniformly umber-brown of a tint very similar to that of the dark form of *Hemerophila abruptaria*, the transverse lines and discoidal spots being just perceptible. In both males and females, the series presented specimens in which there were no dark markings on the fore-wings, save the usual lines and spot, and others in which that portion beyond the outer line was strongly suffused with dark scales, whilst there were forms intermediate between these extremes. In some specimens the transverse line on the hind wing was well marked, in others it was hardly perceptible. The situation of the transverse lines also varied. In a specimen captured at Holloway, the distance between the outer line and the hind-margin, and between the inner line and the base was very small. Dr. Buckell also exhibited a specimen of *Charceas graminis*, captured at Wimbledon on August 30th, the ground colour of which was of an olive tint, and the furcate blotch immediately under the reniform the only white marking; three specimens of *Oporabia dilutata*, bred from pupæ dug at Sutton Park, near Birmingham, one of which was a distinctly melanic form with a striking white blotch in the middle of the median nervure; a specimen of *Epinephele tithonus*, captured at Bookham, in which the ocellus on the fore-wing had only one pupil. Mr. Clark, two very dark specimens of *Ennomos angularia*. Mr. Kirby, specimens of a *Noctua* received from Berkshire, and intermediate in appearance between *Dasycompa rubiginea* and *Orrhodia vaccinii*. These specimens led to a discussion, and although the form was quite new to the members present, the general opinion was that they were varieties of *D. rubiginea*. Mr. Battley, *Orthosia lota*, *O. macilenta*, *Xanthia gilvago*, *Hadena protea* and *Pylalis glaucinalis*, all from Winchmore Hill. Mr. Riches, *Scopelosoma satellitia* and the red form of *Orthosia lota* from Salisbury. Mr. Oldham, a long series of *Agrotis segetum* from Norfolk. Captain Thompson, a dark form of *Eubolia cervinaria* from Hornsea, Yorks. Mr. Southey, series of *Agrotis porphyrea*, and *Triphæna interjecta* from Hampstead Heath. The following gentlemen were then nominated as officers for the coming year:—President and Treasurer, Mr. J. A. Clark; Vice-Presidents, Mr. J. W. Tutt and Dr. F. J. Buckell; Curators, Messrs. Heasler and Smith; Librarians, Messrs. Gurney and Prout; Secretaries, Messrs. Nicholson and Battley; Council, Messrs. Oldham, Lewcock, Newbery, Hollis and Captain Thompson.

Dr. Buckell then read his paper on "The History of Butterfly Classification" (*vide ante* p. 315).

Tuesday, 5th December, 1893.—Exhibits:—Dr. Buckell, a series of *Noctua rubi*, bred from a female captured at Wimbledon in August, these being, therefore, the third brood. The females of this series followed the female parent in being almost unicolorous, while the males had the black dot below the stigmata developed into a wedge-shaped mark, similar to the claviform of the *Agrotidae*. Mr. Clark, a variety of *Arctia caia*, with the hind wings much suffused with black. Mr. Hill, *Cymatophora ocularis*, from Wicker, a female of *Lycæna icarus* with white spots, and a specimen of *Vanessa antiopa* taken by Mr. Geo. Turner, at Hythe, Kent, 30th August, 1893. Mr. Battley, series of *Melanippe montanata*, from Hale End and Rugby. He pointed out that the Hale End specimens had a very dark band on a clear, cream-coloured ground, whereas the band in the Rugby specimens was much

paler, and the space between the band and the hind margin was clouded with brown. Mr. Oldham, *Hypsipetes ruberata*, from Cambridgeshire; also the melanic form of *Hybernia leucophæaria*, *Himera pennaria* ♀, and a specimen of a dragon fly, *Libellula quadrimaculata*. Mr. Hill stated that a specimen of *Catocala fraxini* had been seen on two occasions, on sugar, at Bexhill, the "sugar" being composed of marmalade and brandy.

The gentlemen nominated at the previous meeting, as officers for 1894, were unanimously elected.

The Secretary read the Report for the past year, from which it appeared that, although the session had been a quiet one, the attendance and membership roll were both larger than those for 1892.

The President then gave his annual address, which mainly consisted of a review of the list of London birds which he had compiled in connection with the London fauna lists undertaken by the Society, at the same time handing to each member present a copy of Mr. Tutt's new book, *Random Recollections of Woodland, Fen and Hill*.

Captain Thompson proposed a vote of thanks to the President, Vice-presidents, and Officers, for their services during the past year. This was seconded by Mr. Hill, and carried.—A. U. BATTLE and J. A. SIMES, *Hon. Secretaries*.

ENTOMOLOGICAL SOCIETY OF LONDON.—November 8th, 1893.—Mr. Henry Jerome Turner, of 13, Drakefell Road, Hatcham, S.E.; Mr. F. W. Urich, of Trinidad, West Indies; and Mr. John Cooper Webb, of 32, Henslowe Road, Dulwich, S.E. were elected Fellows of the Society.

Mr. F. Merrifield exhibited some low temperature forms of *Vanessa atalanta*, artificially produced, which showed a great reduction in the area of the scarlet bands on the wings, and a great increase in the area of white and bluish markings. Professor E. B. Poulton described, and illustrated by means of a map, a simple method for showing the geographical distribution of insects in collections. Below the name-label of the genus and of each species were placed coloured slips of such a size as to be distinctly visible at a distance, and the colours, with one exception, corresponded with those made use of in the map at the beginning of vol. i. of Dr. A. R. Wallace's 'Geographical Distribution of Animals.' The exception referred to was the Palearctic Region, which was coloured blue instead of pale brown, as in the original. Framed maps of the same kind; and coloured in the same way as the one he exhibited, were to be placed in museums, so as to be readily seen from various groups of cabinets. In these maps the names of the Regions, and numbers of the Sub-regions, were distinctly printed, so that they could be read at a considerable distance. Prof. Poulton added that the method he had described was being gradually introduced into the Hope Collections at Oxford. Mr. McLachlan stated that a somewhat similar plan to that described by Prof. Poulton for showing the geographical distribution of insects, had been adopted in the Brussels Museum by Mons. Preudhomme de Borre. Mr. W. F. H. Blandford, Dr. D. Sharp, Mr. C. J. Gahan, Mr. C. O. Waterhouse, Mr. Osbert Salvin, Prof. Poulton and the President continued the discussion. Dr. Sharp read the following extract from Dr. Livingstone's "Narrative of an Expedition to the Zambesi," and stated that he was indebted to Mr. Gahan for calling his attention to it:—"We tried to sleep one rainy

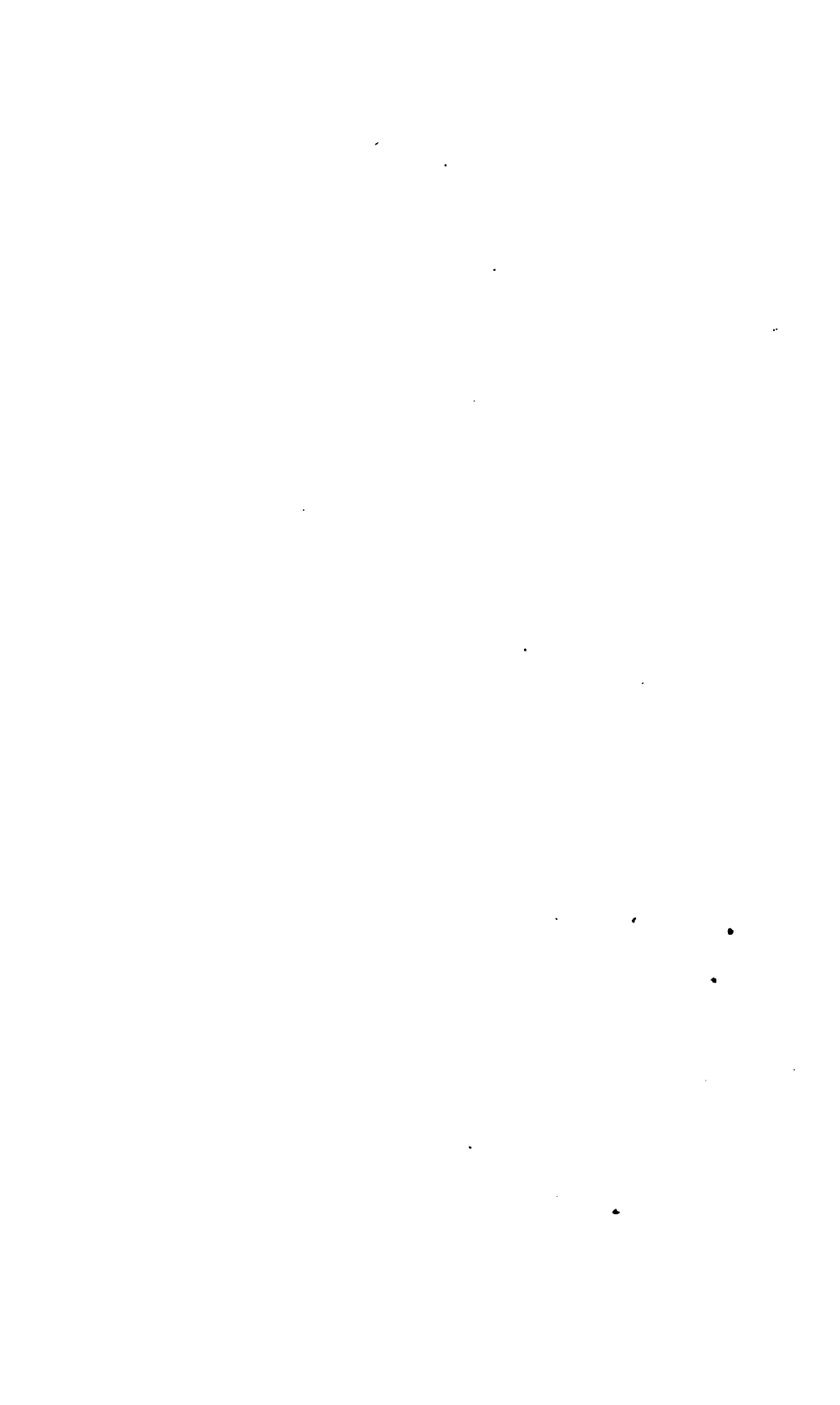
night in a native hut, but could not because of attacks by the fighting battalions of a very small species of *Formica*, not more than one-sixteenth of an inch in length. It soon became obvious that they were under regular discipline, and even attempting to carry out the skilful plans and stratagem of some eminent leader. Our hands and necks were the first objects of attack. Large bodies of these little pests were massed in silence round the point to be assaulted. We could hear the sharp, shrill word of command two or three times repeated, though until then, we had not believed in the vocal power of an ant; the instant after we felt the storming hosts over head and neck, &c." Prof. Poulton read a paper entitled "On the sexes of larvæ emerging from the successively laid eggs of *Smerinthus populi*." Mr. Merrifield, Dr. Sharp, and the President took part in the discussion which ensued. Mr. W. L. Distant communicated a paper entitled "On the Homopterous genus *Pyrops*, with descriptions of two new species." The President read a paper, written by himself and Mr. J. Edwards, entitled, "A revision of the genus *Eneis*," which he characterized as the most cold-loving genus of butterflies. He also exhibited his complete collection of species of this genus. A long discussion ensued, in which Prof. Poulton, Mr. McLachlan, Mr. Salvin, Mr. Bethune-Baker, the Rev. Dr. Walker, Mr. Kirby, Mr. Merrifield, Mr. Barrett, Mr. Blandford, Dr. Sharp, and Mr. Jacoby took part.—H. Goss, *Hon. Secretary*.

THE SOUTH LONDON EMTOMOLOGICAL AND NATURAL HISTORY SOCIETY.
—*Thursday, November 9th.*—Mr. R. Adkin exhibited a bred series of *Hypsipetes ruberata*, from Sutherland; also *H. sordidata*, and *Emmelesia minorata*, taken in Inverness. The *H. ruberata* varied from pale grey with numerous transverse darker stræ to light chocolate-brown with slightly darker basal patches, whilst some were light greenish-grey with dark brown lines. Some of the *H. sordidata* were of a dark mottled brown, while others were greenish. A discussion ensued concerning the food-plant of *H. ruberata*; it was stated that those bred from sawlow were almost invariable and of the red form, while those from willow were most variable. Mr. Carpenter, *Boarmia repandata* bred, from the New Forest, about half the brood being the *conversaria* form, but not so striking as the N. Devon race; one specimen was intermediate in colour. Mr. West, a light var. of *Abraxas grossulariata*, taken at Streatham. Mr. Oldham, light forms of *Agrotis segetum* from Woodford, and dark ones from Norfolk; also a piece of ash bark, channelled by either a *Tomicus* or *Scolytus*. Mr. Watson reported a second brood* of *Apatura iris* in the New Forest, he having taken a full-fed larva on October 7th, which he was daily expecting to emerge. Mr. Carrington gave a most interesting account of his recent experiences in Manitoba. He stated that the day after leaving Merville a specimen of *Vanessa urticae* appeared on deck and continued to be seen until the day before reaching land, and that on the return voyage several species of Lepidoptera were observed, having no doubt been sheltered in hay, which formed part of the cargo. West from Quebec up to the forest region the vegetation seemed but little different from that of Europe. The most striking flower was the Chicory (*Cichorium intybus*), while the Oxeye Daisy (*Chrysanthemum leucanthemum*) was along the railway banks

* Is there any reason for supposing that there was more than an odd specimen or so?—Ed.

in profusion. This latter had crept for quite 200 miles into the forest region, but was only seen on the banks. Here on the Umbelliferæ were seen quantities of *Argynnis*, besides many other species, and he considered these banks and the numerous station clearings to be admirable collecting grounds. There seemed but little life in the forests of fir away from the railway track. *Vanessa antiopa* was seen here and there, and a *Papilio* was common in one place. Insects seemed little disturbed by the passing train, and a few came into the carriages. The prairie region was so absolutely flat as to appear a consolidated sea. Here there was more life; Lepidoptera were less plentiful, but Neuroptera and Orthoptera were in swarms, while some of the Diptera, presumably a *Culex*, were almost intolerable from the persistence of their attacks. Messrs. Fenn, Watson and others took part in the discussion which ensued, and a hearty vote of thanks to Mr. Carrington was unanimously passed.

Thursday, November 23rd.—Mr. Carpenter exhibited captured specimens of *Argynnis paphia* from the New Forest, one male and one female having a portion of the right primary in each with a whitish ground, also a non-metallic intermediate var. *valezina*. Mr. Frohawk, specimens of *A. paphia* and var. *valezina*, which had emerged on November 20th and 21st, having been kept at the ordinary temperature. He also reported having bred *Vanessa atalanta* this month, and that the *Apatura iris* of Mr. Watson had emerged but was a cripple. A long discussion ensued regarding the second broods of the *Argynnidi*, what usually takes eight or nine months having been completed in as many weeks. The general opinion, however, was that the temperature by itself had very little influence. Mr. Weir, *Lycæna trochilus*, from the S. African Republic, sent by Dr. Rendall, *Lycæna exilis*, taken at Las Cruces by Prof. Cockerell, and our British *Lycæna minima* for comparison. He remarked on the undesirability of giving comparative names, the two former species measuring 15 mm. in expanse of wings, while the latter varied from 17 mm. to 22 mm. Mr. Adkin, two specimens of *Polyommatus phleas*; in one the copper band of the hind wings was all but obliterated, and in the other represented by narrow streaks on the wing rays. Mr. Perks, a specimen of *Polyporus squamosus*, from St. James's Park, weighing 8 lbs. A discussion ensued as to the paucity of species of Fungi this season, although individuals of some kinds were extremely numerous, and many experiences in cooking and eating these interesting morsels were given by various members.—HY. J. TURNER, *Hon. Report Sec.*





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